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Pellagra Number

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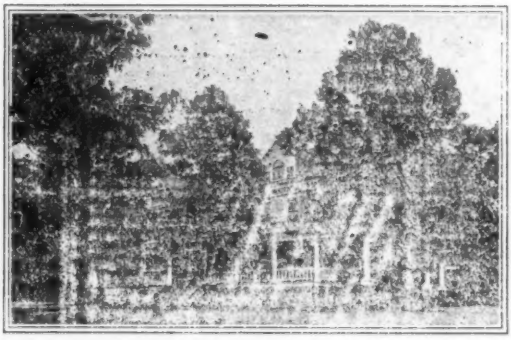

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ORIGINAL ARTICLES.

INTRODUCTORY REMARKS ON PELLAGRA

By S. M. SANDWITH, F. R. C. P., Gresham Professor of Physic, London, England

Although my professional engagements in London prevent my accepting the courteous invitation of the South Carolina State Board of Health to attend the National Conference on Pellagra, I gladly avail myself of their further request that I should write a short paper on the subject.

I feel that my first words must be those of congratulation and encouragement to the many physicians in the Southern States who are now working at the various problems connected with pellagra. Congratulation in the first place, because they have discovered the existence of the disease; because they have impressed this discovery upon others so that the presence of pellagra is now thoroughly recognized by competent observers; and because they have provided us with a literature on the subject in the English language. This cannot but be of interest to me, because, until I began to write on Pellagra, there were apparently no literary contributions in our tongue, if we except two or three accounts written by travellers to describe cases they had seen in Italy. The English text books are either silent on the subject, or frankly ignorant.

If I venture also to encourage American co-workers, it is not with any improper desire to draw attention to my

*Read at the National Conference on Pellagra, Columbia, S. C., Nov. 3-4, 1909.

own work, but because I happen to be in the unique position (with regard to this one disease) of being able to appreciate their difficulties.

So long as 1893, while preparing a paper on Ankylostomiasis, I became aware that some of my peasant patients at Kasr-el-Ainy Hospital in Egypt, were suffering from dermatitis, baldtongue, diarrhea, pains in the back, alteration of the knee joint, insomnia, and melancholia, all symptoms which could not legitimately be attributed to the anaemia caused by the hook worms. Quite ignorant, at that time, of Pellagra, which was not known to exist outside of Europe and Mexico, I determined to study the disease in Italy.

Landing at Venice, I was disappointed to find that the physicians of the general hospitals and lunatics asylums there, were not interested in the disease, though at Milan and in its neighborhood, I found many who were well acquainted with it, especially in the lunatic asylums, and at the *pellagrosarii*, or farm sanatoria for the care of chronic patients.

I had no difficulty in identifying the pellagra of Lower Egypt with that of Italy, though the complications of the disease are obviously different in an Italian carnivorous alcoholic, and in an Egyptian, who habitually takes little meat and no alcohol and is likewise infested with entozoa (*Ankylostomum duodenale* and *Schistosomum hæmatobium*)..

Upon my return to Egypt, I succeeded in interetsing a few of my English colleagues in pellagra, but I had to wait many years to induce the Egyptian government to make any inquiry into the prevalence of the disease, though my facts and figures had never been disputed.

Maize (Zea Mays) was introduced into Egypt as a cereal from Syria, about 1840, yet Pellagra was not discovered until 1893, though it had, perhaps been present for years in the county districts.

In spite of denial from American authorities on medicine, I have always suspected that Pellagra might exist, unrecognized, in the South, and at one time I requested my friends to put me into communication with the poorest folk of the maize-eating districts. I was referred to a settlement in Eastern Virginia for pauper negroes, but on investigation, I found that the inmates lived in stone houses on pork rations, and I came to the conclusion that the word "poverty" represented no condition in America which could compare with the misery of the impoverished peasants of Italy, Roumania or Egypt.

During the South African war, I found myself surrounded by poor colored folk living on maize, and I naturally expected to meet with some Pellagra among them but every medical man practicing in the country assured me that no such disease had ever been seen. Yet, in the year 1900, I saw two cases of Pellagra among the lunatics of Robben Island, Cape Town, and had previously recognized a third case at Bethlehem Hospital (London) which has been importe dfrom South Africa.

This re-awakened my suspicions with regard to the United States, and I was not surprised in 1902 to hear of the pellagrous farmer, reported by Dr. H. F. Harris of Georgia.

In April, 1905, I had the good fortune to be at Boston (Mass) during an epidemic of cerebro-spinal meningitis, and the very first patient whom I saw at the City Hospital, by the courtesy of Dr. C. F. Withington, was an Italian immigrant who also displayed a well marked pellagrous eruption. This leads one to wonder whether the United States Public Health and Marine Hospital Service officers, who examine the emigrants at Naples, and other Italian ports, should not include Pellagra among the prohibitory diseases.

Now that the diagnosis of Pellagra has been firmly established in many States, it would be well to find out for certain how many people are attacked by the disease in the South. In order to arrive at any correct figures, it might be well to institute compulsory notification of the disease, at least as a temporary measure. In Italy there has been a law to that effect since 1888. The lunatic asylums will continue to yield a certain number of advanced cases, but Pellagra should be searched for among the out-patients of general hospitals, and in the private prac-

tice of country doctors. I would also recommend that agricultural laborers should be examined in the States where Pellagra is known to be prevalent, such as Georgia and North and South Carolina. This might be done in February or March, when the eruption is likely to be present.

In 1901-2, I obtained permission to examine 500 Egyptian peasants, who were actually at work in the fields; they all stoutly denied that they were ill, and their employers, who worked with them, stated that they could all do a fair day's work. Yet, in every field I found early cases of Pellagra, varying from 15 per cent in well-to-do districts, to 62 per cent in the inhabitants of the poorest hamlets.

Though maize was the last of the great grain crops of the world to be brought within the domain of civilized agriculture its production has now attained such magnitude that in some years it constitutes the greatest cereal crop of the world. As at least three quarters of the world's maize crop is grown in the United States the cultivation and curing of this cereal are of supreme importance to every American citizen. Already the question has excited the interest of investigators like Dr. Carl L. Alsberg.

If a complete census could be obtained of the pellagrous, it might be found that the two sexes suffer equally, unless the women have a less varied diet than the men, and I shall be surprised to learn that the children (after the age of ten) are fairly exempt, as more than one American writer has stated during the last two years.

One of the objections to the diseased maize theory of causation is that cases are sometimes reported of pellagra occurring among those who have never eaten maize. In examining more than 1000 cases of pellagra, I have of course, often met with individuals who stated that they were not maize eaters, but on cross examination every one of them pleaded guilty of having occasionally eaten bread which was partly made from maize flour. I therefore venture to suggest that any *undoubted case* of Pellagra should be thoroughly questioned, before we inculpate a second cereal, or attempt to overthrow the belief that diseased maize is a potent factor in the etiology.

Two cases of Pellagra have recently been recorded in patients who had never been out of the British Isle, but the published accounts do not tally with the disease as I knew it, though the symptoms were somewhat similar to pellagra. One of the patients had never eaten maize, but had devoured raw oatmeal and rice.

A recent writer said that he thought maize might bear the same relation to Pellagra as the swamp does to malaria. I would prefer to say that maize may be to Pellagra as the mosquito is to malaria, remembering always that an uninfected Anopheles is unable to communicate malaria to any human being.

The diagnosis of pellagra is unusually not difficult to anyone acquainted with the disease, but two groups of patients have often puzzled me; in the demented, unable to give any account of themselves, it is somtimes not easy to determine whether Pellagra was or was not, the foundation of their mental failure, though sometimes the re-appearance of a rash at the advent of spring will help to decide the question. Another doubtful class of lunatics is affected with real or "pseudo-general paralysis," and in exceptional instances doubt may still prevail after the autopsy.

Anyone hesitating between the diagnosis of Pellagra and leprosy must be profoundly ignorant of both diseases.

I notice that some, whose attention has lately been drawn to the study of Pellagra, are puzzled by the use of the term "pseudo-pellagra," used by French writers. I have never employed this word myself. I have never heard it made use of and I know of no circumstances under which it need be used. Roussel, a French physician, who wrote on Pellagra between 1842 and 1866, called certain cases of "sporadic pellagra" in France, which only faintly resembled the endemic disease, "pseudo-pellagra."

Most of the cases of so-called "sporadic pellagra" clearly rested on errors of diagnosis during the years which followed Roussel's discovery that Pellagra occurred in thec entre of France. (3).

Dejeanne, in 1871, subjected these French cases to a thorough scrutiny and wrote "these are maladies differing wide-

ly among themselves, and all of them very different from endemic Pellagra, not only in the eitology but also in the nature and concatenation of the symptoms." Surely, it is unnecessary to revive this antiquated discussion. (4).

The treatment of early cases, without mental symptoms, can be successfully accomplished by putting the patient on a liberal diet, excluding maize, and by ridding him of the hook worms which are so often co-existent, but the pellagrous symptoms return if he is allowed to resume a diet of musty maize. Various preparations of arsenic are useful in advanced cases, but when the brain is attacked there is small hops for the patient unless by sero-therapy. Pellagra is essentially a disease which cries for preventive measures.

Italy, by preventive measures, has, since, 1888, reduced the mortality of Pellagra from 3483 to 1635, though during the years 1883 in 1907, the maize area under cultivation has increased from 5.79 to 6.33 per cent. of the whole country. This points the moral that it is ing the years 1883 to 1907, the maize which is at fault. There are certain general axioms which prove true in Italy and Egypt, and it will doubtless be found that they hold good in the United States also:

1. In districts where no maize is cultivated or habitually eaten, Pellagra does not exist.

2. There are many districts where maize has been cultivated for many years and yet pellagra has not appeared.

3. Well-to-do people in Pellagra districts, living on varied diet and consuming maize as an occasional, and not as the staple cereal, *usually* escape Pellagra.

4. It is not good maize, or good maize flour, which produces Pellagra, the disease requires for its production the habitual use of damaged maize in some form.

There is a vast Italian literature dealing with the question of what the damage may be, and there is now a considerable concensus of opinion in favor of incriminating *penicillum glaucum* in ordinary Pellagra.

5. We are constantly being reminded by sceptics that the maize area of the world is infinitely greater than the Pellagra area. This is not the point. The question is, does not Pellagra distribution correspond very nearly with the area upon which human beings live who eat damaged maize, or products made from damaged maize?

May I be allowed to conclude these somewhat disjointed remarks by emphasizing Dr. James H. Randolph's dictum?: "There undoubtedly have been many cases overlooked in the past, but the greatest danger to be avoided in the future is not so much the failure to recognize the condition, but rather a too great eagerness to diagnosis as "Pellagra" many related disorders."

We are now waiting, in the confident hope that some of the Pellagra problems, so long unsolved, may be successfully mastered in the United States.

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COMPLEMENT FIXATION WITH LECITHIN AS ANTIGEN IN PELLAGRA—FURTHER OBSERVATIONS.

BY C. C. BASS, M. D., New Orleans.

In a preliminary note published in the Journal of the American Medical Association, October 9, 1909, I reported a positive complement of pellagra. One of these has since been found to have had syphilis and would probably have given

*Read at the National Conference on Pellagra, Columbia, S. C., Nov. 3-4, 1909.

a positive reaction from this cause. Another one of the tests was made on blood taken at autopsy twenty-four hours after death, and is therefore not to be credited fully. There remained, however, four cases that gave a positive reaction without any apparent cause except the presence of pellagra. Since that publication I have tested the blood of ten other cases of pellagra for this reaction, and wish to report them here. In these positive cases one was known to have had syphillis and would probably have given a positive reaction without the presence of pellagra. In the tabulation below it will be convenient to include the former six cases.

Case No.	Type of disease.	Reaction.
4.	Chronic case, 4 yrs. duration; severe acute attack attack, insanity and death.	Positive.
5.	Mild acute case; first year, improved	Positive.
6.	Severe acute case; death, had had syphilis.	Positive.
7.	Severe acute case; death, blood taken 24 hrs. after death.	Positive.
8.	Mild chronic case, severe skin lesions: improved	Positive.
11.	Moderately severe case; also had T. B. which contributed to her death.	Positive.
12.	Severe first attack; death in one month.	Negative
13.	Severe case; diarrhea 1 1-2 yrs. erythema 10 days	Negative.
14.	Severe case; diarrhea and vaginitis 2 yrs; erythema 2 months; had had syphilis.	Positive.
18.	Mild chronic case; improving.	Positive
20.	Very severe case; death.	Positive.
21.	Mild case; first (?) year.	Positive.
22.	Moderately severe, acute attack; 3 or 4 summers erythema; 3 months emaciation; diarrhea and indigestion 27 yrs.	Positive.
23.	Moderately severe case first summer; estivo-autumnal plasmodia in blood, great anemia.	Positive
24.	Three years diarrhea; severe mental symptoms now, erythema pretty well cleared up.	Negative.
25.	Severe case, diagnosed by Dr. Lavinder.	Negative.

TECHNIC.

It will not be necessary to describe the technic in detail, as it is the Wesserman serum reaction for syphilis, with slight modifications to suit my own convenience, and substituting as antigen lecithin for syphilitic liver extract. The hemolytic system used was sheep blood corpuscles, guinea pig complement and sensitive rabbit serum amboceptor.

The hemolytic unit used in all tests was 1-20 C. C. of sheep corpuscles. The lecithin solution used for antigen is a 0.3 per cent solution in equal parts absolute alcohol and salt solution. One-tenth c. c. patients' serum per hemolytic unit must bind the unit of complement or the test is considered negative. All except five of the tests here tabulated were made with inactivated serum. All the tests were controlled by running through at the same time a normal negative serum and also a reacting syphilis blood exactly as is usually done in making Wasserman's reaction for syphilis.

An analysis of the sixteen cases shows that two have had syphilis, one was done on old autopsy blood, and another had estivo-autumnal plasmodia in the blood when the test was made. Excluding these possible sources of error, we still have eight out of twelve cases giving a positive reaction. Of these eight positive cases, seven were of the mild or chronic type and only one was of the severe acute type. Of the four negative cases, all had severe acute attacks and two had their first attacks. Two of these are alive but do not promise to recover from the present attack. The reaction seems more likely to be present in chronic mild cases, and those showing some resistance to the disease which is in keeping with the fact that the complement fixation reaction is due to the presence of antibodies for lipoid substances.

The observations here reported are on far too few cases to permit final conclusion. They should be confirmed by a study of a much larger number of cases,

and by competent observers.

The complement fixation reaction with lipoid substances as antigen has been found in syphilis especially, but also in trypanosomiasis, sleeping sickness, kala-azar, certain cases of malaria, a few cases of scarlet fever and probably other diseases. All of these, except possibly scarlet fever, are protozoan diseases. The reaction has not been found in bacterial diseases except in rare instances.

At the suggestion of Dr. Dock, the strength of the reaction was determined in three positive cases. One-tenth c. c. serum in one case fixed two units of complement; another fixed four units; and one case of two years' duration, fixed twenty units of complement.

I am indebted to the Charity Hospital staff, and to many physicians of New Orleans, and vicinity for courtesies shown.

PATHOLOGY OF PELLAGRA

By H. F. HARRIS, M. D., Secretary State Board of Health, Atlanta, Ga.

There are few, if any, diseases characterized by perceptible organic lesions, the pathological anatomy of which is so difficult to arrive at as that of pellagra.

This is to be accounted for, first and foremost, by the extreme chronicity of the disease. At this point it may perhaps be well to say that some of the earlier American writers on this subject, and those to whom the credit is largely due to calling attention to the wide prevalance of the malady, generally fell into the error of describing the characteristic exacerebrations that come from time to time in the course of this affection, as being "acute pellagra."

As these reports were usually made from asylums, there is little room to doubt that probably most, if not all, of the cases referred to, occurred in persons already victims of pellagrous insanity. Certain it is that in a large number of instances of the disease that I myself have seen, both in and out of asylums, in not a single instance could there be any doubt as to their chronic nature. Still another difficulty lies in the fact that these patients rarely die in the earlier stage of the disease. At such times, the true character of the affection from which they are beginning to suffer is very seldom diagnosticated, and even where this is done the patient is taken off by some intercurrent malady, and the morbid anatomy and histology of the two discases are almost necessarily more or less confounded.

Since the introduction of modern methods of histologic examination there is not in the whole literature, so far as I am aware, an account of a thorough post-mortem examination in an uncomplicated case of pellagra in the earlier stages. Another difficulty has been that the grosser changes are found very inconstantly in most of the internal organs, and are relatively of little importance—it being in the central nervous system, where the alterations are of a microscopical character, that we have to look for the true seat of this affection. As it is only within recent years that our methods have been so developed that many of these alterations can be made out, it follows that the descriptions of the morbid histology given by the earlier writers is of comparatively little importance. In the absence of such methods of examination one can well understand and sympathize with the despairing statement of Bertherand who said, "From an excess of fatality pellagra has causation, no treatment, and no morbid anatomy."

Up to the present time all recorded post mortem examinations with thorough studies of the tissues have been made without exception on old pellagrous subjects, and we are therefore constrained to regard as being typical of this affection those alterations discovered in the terminal stage osf the malady. I would have no hesitation, however, in predicting that the future will show that the initial changes are in the central nervous system.

However, before describing these alter-

*Read at the National Conference on Pellagra, Columbia, S. C., Nov. 3-4, 1909.

ations attention will be given to certain changes in the other viscera that are of clinical importance, and still others will be mentioned on account of their theoretical interest.

SKIN.

A knowledge of the skin lesions in pellagra dates from Casel's first observations which began about the year 1735, although his monograph on the subject was not published until 1762. In the meantime Thierry had gained access to Casal's manuscripts, and published in January, 1755, an account of the writing of the latter on this subject. The alteration begins, as first shown by Raymond in 1889, with considerable suddenness, developing during the course of 24 hours, after a prodromal period of greater or less length. Merck has recently asseted that there is often a preliminary rash, occurring as discreet muculæ, that lasts from a few days to a few weeks. The erythema begins on the back of the hands, and at the bases of the fingers. It is at first a livid red, and after a few days becomes covered with scales and shed-off epithelium; this hyperkeratosis continues throughout the course of the eruption, and is exceedingly characteristic. The tissues are swollen as a consequence of the increase of both blood and serum in the derma, and as a result the normal elevations and depressions of the skin becomes more marked than usual, giving to the back of the hand a wrinkled appearance; the contrast between the youthful face and the aged characteristics of the hand are most striking in some subjects. This lesion extends gradually until in most cases it covers the entire back of the hands and may reach up to a greater or less height along the forearm, and even to the shoulders. It does not often extend to the tips of the fingers, but may do so. After several recurrences, the backs of the hands become pigmented, and in some cases the skin becomes permanently thinned.

Similar lesions are observed on the backs of the feet, though by no means so common as in the location already described; they always occur with or following the eruption on the hands. In that most excellent monograph of Valdea, that writer refers to the frequency of the occurrence of the lesions on the backs of the feet in Yucatan, and it would appear to me, from the descriptions I have read of the disease as it occurs there, that it is more frequent here than in Europe. The erythema may spread to the ankles and legs.

In quite a number of cases the lesion is observed on the face, beginning usually on the bridge of the nose, and gradually extending over its entire surface and down of the cheeks, and in extreme instances may reach to the chin and lips, and spread itself finally over the entire countenance. It is more frequent in men than women. The scalp remains normal. The eruption may be in small distinct spots, though it is usually confluent. In some cases it occurs also on the neck and extends down the sternum, giving rise to the so called "Casal's neck tie."

More rarely still other parts of the body may be affected, the change being observed on the elbows, on the arm, and on the skin covering the popliteal space, on the scrotum, around the anus and in the perineal region. For women the vagina may be inflamed, and later ulcerated. In a rapidly fatal case in a white man following the eruption on the hands. I recently observed spots scattered over the various parts of the body and pigmented to such a degree that they appeared almost black; they were not preceded by an erythema. Similar discolorations occurred in the perineal region on the scrotum and around the anus In the severer forms particularly the backs of the hands, sometimes exhibit small bladder-like elevations filled with serum, which later burst, leaving superficial ulcers that heal very slowly; occasionally similar lessions are found on the backs of the feet and even on other parts of the body. It is said that in rare instances the erythema may cover the entire body. In the mildest forms of the disease no skin lesions occur..

On microscopic examination, as first shown by Babes and Sion, sections of the hyperemic skin exhibit a slight serous exudate with a few luccocytes, and peculiar homogeneous, metachromatic masses of what appears to be coagulated

albumin; the sweat glands contain metachromatic granulations. The small nerves show practically no change.

In the stage of desquamation the changes are much more pronounced. There is hyperkeratosis with shedding off of the corneous layer of the epiderma; the inner epithelium layers contain much yellow pigment. The papillae contain numerous lymphocytes and plasmacells, with quite a remarkable absence of mast-cells in all cases that I myself have examined. The sweat glands are hypertropied, and the sebaceous glands are dilated and often contain bacteria. The skin is thickened as a result of the increased blood supply, and from the presence of swollen degenerated elastic fibers and the peculiar hyalin albuminous substance already referred to.

Where ulceration occurs there is complete absence of the epithelium layer, with more or less substance on the surface of the derma. The elastic and connective tissues that form the bulk of the latter structure undergo degenerative changes on the surface, and there are found in the diseased structures polymorphonuclear leucocytes, a considerable serous exudate, and numerous bacteria. Somewhat lower down plasma and lymphoid cells are quite numerous.

TONGUE:

The tongue undergoes marked changes in pellagra. In the earlier stages the epithelium shows much the same alteration that is observed in the epiderma in the affected areas on the skin. At a later time the epithelial cells shed off around the edges of the tongue, and this may progress until the entire structure appears bare, but a thin epithelium layer may be still demonstrated by means of the microscope. Numerous deep furrows often appear on the back of the tongue as the disease progresses, and its tissues become red. Ulceration is then apt to occur,—first around the edges of the tongue, and in some cases, at a later time, on any part of its surface. Microscopically these changes are practically similar to those occurring on the skin.

CHEEKS AND GUMS:

Similar alterations are found on the gums and on the fuceal mucous membrane, and at certain stages, in many cases in the pharynx. As the disease progresses the back of the pharynx assumes a deep red color, sharply circumscribed and symmetrical, this discoloration may be seen advancing forward over the surface of the soft palate in some instances

STOMACH.

The mucosa of the stomach is often found pale, and its walls dilated as a consequence of atrophy of its muscular coat in some cases its surface is quite red in the pyloric region.

INTESTINES:

Similar alterations are found in the intestines. Anemia or hyperemia are particularly frequent in the jejunum, and ulcers are apt to occur in this situation, and even more often in the ilium. Similar lesions are occasionally found in the large intestine. Not uncommonly the walls of the gut are thinned. The alteration last mentioned is of some historic interest, as the Italian Labus claimed in 1846 that it was characteristic, and it is only after this view had been contradicted by Morelli, and later by a commission appointed by the Congress of Geneva, in 1847, that is was finally established that this lesion is inconstant, and by no means the anatomical criterion of pellagra, as had been claimed.

MESENTERIC GLANDS:

These structures have been occasionally found hypertrophied.

SPLEEN:

The spleen is usually diminished, occasionally hypertrophied, though it is sometimes increased in size. In five of my post-mortems the organ weighed, only once, as much as 1010 grams. Cirrhosis is now and then found. Microscopically the cells of the peripheral portion of lobules are frequently quite fatty, though this alteration is so frequently observed under other circumstances that it scarcely has any significance. The central vein of the lobule has been often times found dilated.

KIDNEY:

The kidneys are usually decreased in

size, but are frequently found to be normal. Cysts in the cortical portions are frequent as a consequence of the scar formation in the viscera. Microscopically they often show the characteristic changes of interstitial nephritis, with which all are familiar, and which therefore it is unneccessary to detail here. In some instances the only alteration has been found to be fatty changes in the epithelium lining of the tubules.

ADRENALS:

The adrenals are normal.

LUNGS:

It is rather curious that tuberculosis is rarely found in the lungs of the pellagrous, but hyperemia, oedemia, and emphysema are occasionally encountered and pleurisy with effusion is not unknown: all of these changes are evidently in the nature of complications.

HEART:

The heart is often slightly atrophied, and has been found fatty and the fibers pigmented in some cases this is evidently secondary, and of no significance. The pericardium is usually normal.

OSEOUS SYSTEM:

The bones are often friable.

MUSCULATORY.

The muscles are usually atrophied, but are sometimes normal.

BRAIN:

Writers such as Strambaio, Fanzago, Leghano, Verga, Labus, Mardi, Carraro, Fantometti, Rizzi, Gorno, Girelli, Biscia, Frank, Bayle, Lallemand, Meckel, particularly Roussel, and others, seem without exception to have found nothing further wrong with the brain than more or less oedema of the pia-arachnoid, along with thickening, or thinning, or adhesions in some cases. In 113 post mortems, Lombroso found in addition to the change first mentioned, atrophy of the brain in 11 cases, with occasional hardening of its tissues; in 18 out of 28 cases, the brain weighed less than normal, but on the other hand, was increased in this particular in 7 instances.

By far the most interesting communication that had, up to that time, been made on the changes in the brain, was an article by Babes and Sion, in 1899. They showed the presence in the nerve cells, particularly in the large chromophilic cells, in the cortex, the presence of unmistakable degenerative changes. The tigroid bodies lose their power of staining with basic dyes, and the cell becomes swollen and vacuolated. The Neuclei are frequently pushed to one side, and lose their power of taking basic stains and present swollen neucleoli; the pigment in these cells is also dislocated, and instead of being around the neucleus lies scattered throughout the cell-body. The processes of the cells often appear to be broken off, and seem swollen. The pericellular lymph spaces are dilated, and the walls of these cavities are frequently lined by yellow pigment. In the brain tissue, small collections of lymphoid cells are frequently encountered, and the neuroglia cells in the vicinity of the blood vessels are swollen. These alterations have been in the main confirmed by Marinesco, Rosso, Richette, Grimaldi, and myself in this country, and are of great interest and importance. In addition to the changes mentioned, I would remark that in all of my cases the small vessels of the brain seemed unusually filled with blood, and the privascular lymph spaces are quite uniformly dilated. There were no collections of lymphoid cells anywhere in the tissue. The nerve cells showing degenerative changes usually measured less than the normal ones, and always contain a greater or less amount of acidophilic protoplasm. The cells suffer to a varying degree in different parts of the brain. Parhon and Papinian have demonstrated, as might have been expected, that the neuro-fibrils of the cells show degenerative changes.

Alterations similar to those found in the ceribrium have been observed by me in the nerve cells of Purkinje. The cell protoplasm loses its affinity for basic stains, and the neucleus undergoes a similar change. The cells contain a finely granular protoplasm that takes acid stains, and in many of the cells only the neucleolus retains its power of absorbing

basic dyes. The neucleus does not seem to be dislocated in these cells so often as in the pyramidal cells. In all of my cases it was quite evident that many cells of Purkinje had undergone degeneration and entirely disappeared. In one instance this change was most striking; in this case the molecular and granule layers were in many places separated by microscopic spaces that probably existed during life, and having the same significance as the dilated lymph spaces. These cerebellar alterations probably explain the atoxic forms of the malady. So far as I am aware, no one has previously observed these alterations in the cerebellum.

SPINAL CORD.

Changes in the nerve cells of the spinal cords are practically in every way identical with those ocurring in the brain, well described by Babes and Sion in the paper already referred to, and have since been confirmed by all who have studied the subject. They show every stage of degenration from slight loss of chromophilic substance to practical distruction of the cell-body. In 1883 and 1884, Tonni degeneration from slight loss of chromoteral columns of the cord, and somewhat later, in 1890, Belmondo demonstrated the frequent occurrances of corporal amylacea in both the grey and white substance, and the presence of changes leading to obliteration of the central canal. Along with this there was increase in the neuroglia fibers, and atrophy of many of the nerves. In 1893 Tuczec published an excellent monograph on the histology of the central nervous system in this disease. Out of 8 cases he found combinscleroses of the posterior and postero-lateral column of the cord, and in two instances a similar change in columns alone, he confirmed the frequency of the obliteration of the central canal described by Balmondo. He also called attention to the curious fact that portions of the gray substancey in the cord are frequently found apparently detached from their normal situations, and even lying as isolated bodies in the surrounding white substance; under such circumstances the cord is more or less deformed in appearance. In 4 out of 5 post-mortems, I have found similar seleroses, and in every instance pronounced changes in the ganglin cells similar to those described by Babes and Sion. I have also, in four out of five cases, found the central canal obliterated, though in no instance through out its entire course; the changes are most pronounced in the lower cervical and dorsal regions.

In one instance I have encountered a typical "meningo-myelitis acuta," such as described by Balmondo. Although the post-mortem was made only a few hours after death, the cord was very soft and on microscopic examination was found to present alterations of a most pronounced kind. The myelin sheathes of the nerve fibers showed marked degenerative changes, and the nerve cells of the gray substance exhibited to a high degree the alterations alread described. Corpora amyalacea were especially abundant throughout both the gray and white substances.

SPINAL AND SYMPATHETIC GANGLIA.

The ganglion cells of these structures exhibit changes similar to those found in the central nervous system, though they are not as a rule so marked.

EYES.

From the results of the work of Beitti, is not improbable that circulatory changes are frequent in the central nervous system in pellagra, as he has shown that in quite a proportion of the cases the retina is æmemic, and in about the same percentage the opposite state of hyperemia occurs.

PERIPHERAL NERVES.

It has been claimed by some that the alterations have been found in the peripheral nerves, but this remains without confirmation.

Pellagra—Its Etology, Pathology, Diagnosis and Treatment.

By C. W. G. ROHER, M. D. Medical Assistant to State Board of Health of Maryland

DEFINITION.

Pellagra is a specific infectious disease, due to a parasite fungus, namely, the *Aspergillus fumigatus*. Locally, pellagra is characterized by an erythematous desquamative inflammation of the skin and generally the diesase is characterized by the formation of tumor-like masses or granulamata in various parts of the body. Constitutionally, the disease is complicated by digestive and neurotic derangement.

The disease may be either acute or chronic. A majority of the cases, however, are of chronic duration.

In the state of Maryland, but three cases, two by Dr. Wm. S. Thayer, of the Johns Hopkins University, and one by the present writer, have been reported up to the present time.

CLASSIFICATION.

Pellagra should be classified along with tubercle, lupus, syphilis, glanders and farcy, leprosy, actinomycosis and rhinoscleroma, as one of the infective granulomata. The abundant presence of tumor-like bodies, especially in the kidneys, lungs, brain, stomach, intestines and spleen, makes the present writer feel justified in vouchsafing this assertion. The superficial portions of the lungs and brain, especially the walls of the blood vessels, show them most abundantly. These small, nodular lesions, when examined by the microscope, resemble very closely a tubercle with the giant-cells removed from its centre, or a syphilitic gumma with the giant-cells eliminated from its periphery.

OCCURRENCE IN ANIMALS.

Recently M. Muller, in the Journal of Comparative Pathology and Therapeutics, described several outbreaks of an enzootic character occurring in lower Alsace-Loraine, and affecting horses, cattle and sheep. The disease, it is stated, was caused by feeding with musty fodder. The principal symptoms consisted in myopathic paresis or paralysis, and in the oxen and sheep in excessive salivation. The pulse and respirations were teria were looked upon as secondary in-

*Read at the National Conference on Pellagra, Columbia, S. C., Nov. 3-4, 1909.

only increased in old standing cases. There was no fever and the sensorium did not appear to be affected. Occasionally animals recovered after a very long period of convalescence.

The so-called cornstalk disease, prevalent among cattle in the west, is probably allied to pellagra. "Blind staggers," and many doubtful cases of cerebro-spinal meningitis in horses are believed by

The disease has been produced experithe present writer to be due to pellagra. mentally in dogs and in chickens.

ETIOLOGY.

The causes of pellagra are predisposing and exciting. The principal predisposing cause is the eating of improperly cured maize or Indian corn. Chronic diarrheal and dysenteric disorders, especially of an ulcerative type, have also been recently advanced as possible predisposing causes. Impure drinking water, it is alleged, may bring about these intestinal lesions, and thus open up avenues of entrance for infection with pellagra.

The use of corn products as a predisposing cause was well established in the fatal case which this writer studied. After the disease had become plainly evident, the patient stated that she could no longer eat corn bread, because it "went right through her."

As no ulcers were found at autopsy in either the stomach or in the intesines, this writer believes their presence to be accidental or due to other causes.

The exciting cause of pellagra was formerly believed to be a parasitic fungus. *Sporisorium maidis*, which produced a dieased condition of Indian corn. Today it is pretty generally conceded that pellagra is caused by *Asperfillus fumigatus*. Some of the fall cases may be due to *Aspergillus flavescens*.

Several observers have found bacteria in the circulating blood of pellagrous patients, and ascribed to them a possible etiological significance. During life, no bacteria were found in the circulating blood of the one fatal case recently studied by the present writer. After death numerous bacterial emboli were found in the various viscera and organs, notably in the liver and in the lungs. These bac-

vaders, and not as causative factors.

According to observations made by the present writer, the *Aspergillus fumigatus* grows not only upon corn, but also upon peas, beans, and other podded or leguminous plants. It also grows upon buckwheat beaten to the ground by heavy rainstorms.

During a wet season leguminous plants, such as peas and beans, are liable to rest upon the damp ground and thus form a nidus or hotbed for the growth of the Aspergillus fumigatus. Buckwheat is sometimes similarly affected. An ear of corn, however, is the most frequent habitat, of the now conspicuous. Aspergillus fumigatus. The warmth and moisture generated by an ear of corn during an unusually wet season, or within the husk of an ear of corn harvested a little too green, furnish ideal conditions for the propagation and growth of the Aspergillus fumigatus.

Another factor hitherto overlooked in the causation of pellagra is the harvesting of corn by machinery. The present writer believes the corn harvester has had much to do with the fairly wide prev alence of pellagra in recent years. To this new departure in agricultural methods should be attributed at least two-thirds of the cases of pellagra. The "corn harvester", therefore can be classified as one of the "predisposing causes" of pellagra.

Corn cut with a harvester is usually bound tightly into small bundles, and hence cannot properly dry and cure. Occasionally it lies upon the damp ground several days before it is placed in the stock. Harvesting while damp or a little too green also helps engender conditions favorable for the growth of the Aspergillus fumigatus.

Corn harvested in the old way by hand is not bound into bundles, and is placed more loosely in the shock. The atmospheric air, as well as the heat and light of the sun, has free access to the ripening ears of corn, and as a rule they cure properly.

PATHOLOGY:

As has already been stated, the present writer believes that pellagra should be classified with the infective granulomata. When examined by the microscope these small tumor-like nodules or granulomata are seen to be composed of a necrotic centre surrounded by spindle-shaped cells and small round cells, very much like a tubercle or a gumma minus giant-cells.

These granulomata are most abundant in the walls of the superficial blood-vessels of the lungs, especially those of the upper lobe of the right lung. Next to the lungs rank the superficial blood-vessels of the brain, thus furnishing a pathological basis for the distressing mental symptoms apparent in the last stages of the disease. Granulomata are also found in the stomach, intestines, spleen kidney and uterus.

Another feature is the intense congestion noticeable in practically all the tissues and organs. An extreme degree of grastroptosis and enteroptosis was also pointed out at the autopsy. The liver showed chronic passive congestion, with numerous bacterial emboli in its smaller vessels. The stomach at its lower fourth is encircled by many varicose veins. Attached to several of these veins is a polypoid growth. The kidneys contain several small cysts, and show a condition of chronic diffuse nephritis. Numerous necrotic areas are also seen. The cortex is narrow, measuring but one-eight of an inch. Numerous granulomatous masses are found in the walls of the uterus. There is a mucopurulent discharge from the internal os. The fundus of the uterus is filled with blood and pus. Hence it would seem that the toxic products elaborated during the growth of the Aspergillus fumigatus have a special predilection for the female uterus, similarly to those generated by the fungus causing ergot of rye, namely, Claviceps purpurea. The heart weighed 5 1-2 ounces, and its interior was filled with white clot. The proportion of the weight of the heart to the weight of he body was as 1 to 233, the patient having been reduced to eighty pounds in weight. The heart also showed the condition known to the Germans as "drop heart." With the exception of slight degeneration of the posterior columns of the cervical portion, the spinal cord shows no conspicuous

change. The blood vessels of the brain contain numerous granuloma-like masses The brain weighed nearly 44 ounces. The skin shows degeneration of its epidermic layers. The deeper of these have been transformed into keratin; the superficial layers have become gangrenous. The cutis vera or true skin shows little or no involvement.

DIAGNOSIS.

The diagnosis of pellagra rests upon the history of the case, and the characteristic symptomatology. The one fatal case which eventually came under my observation had suffered many diagnoses and much treatment, all, however, of no avail. The last diagnosis made before my advent into the case was "Chronic eczema."

A history of the use of corn products as a staple article of diet is very suggestive. My fatal case, as her family informed me, had eaten corn bread every day of her life, both summer and winter.

The characteristic triad of symptoms are:

1. Gastro-intestinal.
2. Erythematous.
3. Nervous.

The gastro-intestinal derangement is usually the initial symptoms of pellagra, dyspepsia, diarrhea and stomatitis are the cardinal symptoms referable to the alimentary canal. My patient had complained greatly of her stomach for three or four years prior to the appearance of the skin lesions. She always drank hot water before meals—the conventional "hot water cure for dyspepia." About the same time she had to desist from eating cornbread, owing to an obstinate diarrhea which it caused.

In my patient the skin symptoms began with unfailing regularity toward the last of April. The skin lesions were first apparent in April, 1907. They began as "small, broad, scattered bumps." The patient and family thought it was poison oak. One of the neighbors also diagnosed it as such, and prescribed a soda water wash; later, she prescribed local applications of hog's lard. The skin lesions first appeared on the dorsal surfaces of both wrists. About a week afterwards these areas "turned red as flannel." From the wrists the erythema extended to the backs of the hands and fingers. About two weeks after the disease had become apparent upon the wrists the feet were affected. The dorsal surfaces of both feet were first attacked, and then the ankles. Red spots also appeared upon both knees. Several days before the feet became affected, the classical red band appeared upon the forehead. The erythema, characterized by its fiery redness, always appeared toward the end of April, and lasted from three to four weeks. At the expiration of that time it disappeared entirely.

The second attack, occurring in April 1908, was more severe and prolonged. The erythema again entirely disappeared in about four or five weeks. In April of the present year (1909) the disease recurred for a third time. This third and last attack was more severe than either of the others. The erythema faded slightly, but symmetrical gangrene of both feet resulted. She grew gradually worse, and died August 20th, 1909 The nervous symptoms were not markedly manifest until a few weeks prior to my patient's death. She was delirious at times, and always thought that somebody was going to kill her. My patient did not have any convulsions, but at times was in a stupor. My patient suffered but little pain. The skin from the diseased areas could be cut or torn without entailing any suffering. She was very sensitive, however, to heat and cold. For about a year and a half, so the members of her family stated, she was getting thin in flesh, hollow-eyed, and of a swarthy complexion.

TREATMENT.

The treatment of pellagra, like that of other infectious diseases, may be either prophylactic or curative. Prophylaxis, however, is the more important. Right here, and in the following words, I wish to sound the keynote of this conference, *Upon proper prophylactic measures depends the suppression of pellagra.*

The essential prophylactic step can be summed up in the one terse sentence—discontinue the use of spoiled maize or Indian corn. It were better perhaps

to institute measures to prevent corn from becoming musty or spoiled. The proper curing of corn is a *sine qua non* in the prevention of pellagra. This can scarcely be hoped where corn is cut by machinery. Leguminous plants and buckwheat, which have lain upon the damp ground, should not be used for human food.

The curative or medical treatment of pellagra is notoriously unsatisfactory. In brief, it is a feeble attempt to combat the symptoms as they arise. The question of diet is all-important. Avoidance of the suspected cereal and the substitution of other food, easily assimilable articles of food is the one thing needful. Among drugs ferruginous tonics and arsenical preparations are indicated. The stock diarrheal mixtures are advocated for the gastro-intestinal irritation. Opiates may be called for, if the tenesmus be great.

My patient received one-half ounce of whiskey and one-fortieth of a grain of strychnia sulphate every four hours. Her appetite was poor, and about the only thing she relished was ice cream. Five-minim doses of atoxyl were given hypodermically every four hours, but without any appreciable results.

Dr. Wm. S. Thayer, of the Johns Hopkins University, apparently cured one of his cases of pellagra by the use of thyroid extract. He gave three 2-grain doses of desiccated thyroids a day for several weeks, and then decreased the dose to four or five grains daily, continuing the same for several months.

SUMMARY AND CONCLUSIONS.

1. But three cases of pellagra have been reported in Maryland, up to the present time. Two of these were reported by Dr. Thayer, and the third by this writer. Thanks are due my able chief, Dr. Marshall Langton Price, Secretary to the State board of health of Maryland. For an opportunity to study the prevalence of pellagra in Maryland.

2. Pellagra is an infectious disease, produced by the Aspergillus Fumigatus. The Aspergillus fumigatus is not very tenacious of life. Not infrequently it it is overgrown by the common blue-green mould (Penicilium crustaceum), or much less frequently it is overgrown by common white cottony mold (Mucor mucedo); hence the confusion in regard to etiological factor. The Aspergillus flavescene, to which the so-called fall cases of pellagra are attributed, is probably a slightly modified Aspergillus fumigatus.

3. Personally I believe the appelation "fall attack" of pellagra to be a misnomer. It is merely a recrudescence. In the summer there is a temporary abatement of the symptoms due to the use of fresh vegetables and fruits. Upon the resumption of dry foods in the fall of the year, there is a flaring up of the spring attack.

4. Pathologically, pellagra should be classified with the infective granulomata.

5. The following is additional evidence that pellagra is due to a fungus: The skin lesions in pellagra are similar to those produced by an allied fungus, namely, *Claviceps purpures* the organism which excites the growth of ergot of rye.

6. It was definitely proven that musty corn was the cause of my fatal case of pellagra. To prevent pellagra, corn meal should be made from properly cured corn. Also, avoid eating leguminous foods, (peas and beans), and buckwheat, the pods of which have lain on the damp ground. The aspergillus fumigatus sometimes grows upon these articles of food, but the role which they play in the causation of pellagra is a minor one.

7. Meteorological conditions, especially in the great corn belt, have much to do with the prevalence of pellagra. Many cases are apt to follow a wet season, while comparatively few will develop after a dry season. A wet season furnishes ideal conditons for the growth of the Aspergillus fumigatus. The past season has been remarkable dry one, hence we need not evpect a new outbreak of pellagra for sometime to come.

8. The harvesting of corn by machinery, that is, the use of the corn harvester, sometimes called the the corn binder, is responsible for the alarming prevalence of pellagra in recent years. The corn is bound into bundles and cannot ripen or mature properly, owing to exclusion of the air and sun; a favorable

environment is thus afforded for the growth of the Aspergillus fumigatus.

TRANSFUSION IN PELLAGRA

By H. C. COLE, M. D. and GILMAN J. WINTHROP, M. D. Mobile, Ala.

The existing uncertainty as to the etiology and as to the toxin or toxins producing the symptoms of pellagra, prohibit, at present, the formulating of a scientific or rational therapy. Any remedial or surgical measures employed must, necessarily, be based on empiricism and experimentation.

Study of the etiology of the disease, chiefly by Italian and German workers and more recently in this country, has led to three chief theories as to the cause of pellagra. Firstly, the maize or "zeist" theory, which holds that decomposition of the oils or "zein" of corn produces the poisons causing pellagra. Secondly; the "verdet" theory of Lombroso, which claims that the growth of certain fungi, penicilli and aspergilli, on maize produces a toxin. The ingestion of this toxin containing corn produces pellagra. Thirdly, the microbic or bacterial theory, suggested by Tizzini, Panichi and others, which supposes that pellagra is due to a specific bacterium which grows on maize and elaborates characteristic toxins.

That maize, especially when exposed to moisture and heat, bears a close causative relation to pellagra is rather generally conceded. Whether the toxic principles are developed in the corn itself or whether maize is pathognic only in so far that poisons can develop in it by the action of micro-organisms is still a matter of speculation.

The discussion as to the theories of the etiology of pellagra is beyond the scope of this paper. We shall confine ourselves to a consideration of the theories experiments and facts bearing on the nature and action of the toxic substances of pellagra, no matter what be their origin and suggest the possibility of combatting these toxins invivo by antagonistic substances formed in the body by natural or acquired immunity.

Granting, as seems justifiable, that pellagra is an intoxication, let us consider the work done as to the biologic actions of the toxins.

Tizzoni (1) has shown that by injecting the blood of pellagrous patient into animals, typical symptoms of the disease are produced. This may be explained by the passage of toxins from the affected to the non-affected animal, or as Tizzoni suggests, to the transmission of living (tozin bearing?) bacteria specific of the disease.

Lombroso (2) claims to have produced typical pellagra manifestations by the administration of an alcoholic extract of impure maize ("pellagrozein.")

These experiments seemingly prove the existence of a toxic principle capable of producing pellagrous symptoms, laying aside any consideration as to their chemical, microbic or fungous origin.

Admitting, then, the existence of specific toxins, may we not rationally consider the probability that the body tissues form anti-bodies or anti-toxins to combat their action? Much of the late work on sera and toxins tends to answer this supposition in the affirmative.

Babes (3) and other workers have found in the serum of pellagrins a substance antagonistic to the extracts of damaged maize, that is a specific antitoxic body.

Giovanni and Gatti (4), from their work on pellagrous serum conclude that the serum of pellagrins has a hemolytic action much above normal demonstration the presence of an anti-body. They further claim to have demonstrated precipitative properties in pellagrous blood.

D'Ormea (5), working independently, likewise concludes that there is a definite specific anti-body developed in pellagrins.

*Read at the National Conference on Pellagra, Columbia, S. C., Nov. 3-4, 1909.

Antonini and Marianni (6) claim that a definite immunity is developed in cured cases of pellagra and that the serum exhibits a definite anti-toxic action against maize poisons. They have developed an artificial immunity in rats, rabbits, and goats, against pellagrous toxins. Finally they conclude that a serum therapy can be instituted in grave pellagra cases.

Accepting the statements of these workers, we are led to the following conclusions:

1. Pellagra is an intoxication.

2. The toxic principles of pellagra exist in the blood of pellagrins and will produce pellagrous symptoms when trans ferred to other animals.

3. Pellagrous serum exhibits definite precipitative, hemolytic, and antitoxic properties.

4. An artificial immunity can be produced in animals and exists in cured pellagrins.

Our work in pellagra was undertaken independently of any knowledge of the researches of others, as to the existence of anti-bodies in pellagra. Being interested in the subject of transfusion, and working on its effect in shock and hemorrhage anemia in dogs, we were led to try transfusion in pellagra, at first, simply as a relief for the existing anemia in these cases. The possibility of the existence of a specific curative agent, of the nature of an antitoxin, performed in cured cases, and which might be transfused with the blood, very naturally suggested itself.

Through the kindness of Drs. McCafferty and Tisdale, of the Mt. Vernon Hospital, we were enabled to perform a transfusion in a severe case of pellagra using a cured case of pellagra as the donor. As far as we are able to ascertain this is the first transfusion performed in pellagra (7). The results of this first transfusion were quite suggestive and led to further experimentation. The results and conclusions of some nine cases of pellagra, so far transfused, are noted in the second part of this paper.

The difficulty of securing cured cases as donors has forced us to employ normal, healthy individuals in a number of our transfusions. We have chosen these non-pellagrous donors from among persons living in the same surroundings, eating the samé food, and subject to the same chances of infection as the patients themselves. It is possible that these donors have developed a certain amount of immunity and certain anti-toxic bodies in their blood. Whether these anti-bodies be present or not, the amount of blood furished on transfusion must, at least, combat the existing anemia and stimulate the protective and recuperative activities of the recipient.

The number of cases of pellagra so far treated by serum injection and direct transfusion of blood is too small to permit of final deductions as to their therapeutic value in the disease.

We attempt to give below, a resume of the cases in which serum therapy and blood transfusion have been employed. The date for this report has been obtained from monographs and personals communications with the various workers.

The curative value of pellagrous serum has been chiefly tried by the Italians. Antonini and Marianni (8), using the serum of recently recovered typhoid types of pellagra, note cures in several severe cases. Their work was most care fully performed and the potency of the serum was tested on animals before being administered to patients. Lombroso in a personal communication to the authors of this paper, comments on the work of Antinini and Marianni (11), and states that the use of serum is of undoubted value in the treatment of pellagra.

Dr. Lavinder, of the Marine Hospital and Public Health Service, has employed serum in the treatment of two cases of pellagra. The first case received but one injection of serum and died within three days of an intercurrent pneumonia. The second case received four injections and at first seemed to improve, but this was not continuous and at the last report the patient was "steadily losing ground."

The belief of the Italian workers in the efficiency of pellagrous serum will, we hope, lead to a more extensive trial of this most simple therapeutic measure, and so furnish information as to its true value.

Besides our nine cases of direct blood transfusion in pellagra, which are given

in detail below, we wish to note two other cases. Drs. Wood & Green (9) of Wilmington, N. C. transfused a case of three years duration. This case which they state was in a "hopeless condition," received about six to eight ounces of blood on transfusion. No apparent improvement was noted and the patient died. The second transfusion to be noted was performed by Drs. McCafferty and Tisdale, of the Mount Vernon Hospital, Mt Vernon, Ala. The patient was transfused from a cured case of pellagra and received approximately a pint of blood. Five days after transfusion, the skin lesions began to disappear and in fourteen days the patient was up and walking about.

TECHNIC.

The following cases were transfused by the canula method of Crile or by the suture method of Carrel.

REPORT OF CASES.

Case 1: Alice F., aged 25, colored. Referred by Dr. McCafferty and Dr. Tisdale Mt. Vernon, Ala.

This patient has had pellagra for three weeks and presents, on examination, the characteristic skin lesions over the hands, arms, face and legs. There is a stomatitis so severe as to seriously interfere with nourishment, incontinence of the bowels, marked emaciation and asthenia. Hemoglobin 70 per cent.

The patient is in a moribund condition.

Transfusion—Aug. 3, 1908. The donor is a well nourished negro woman who recovered from a severe attack of pellagra one year ago. There was a good transfer of blood for about twenty minutes.

August 4—Twenty four hours after the operation the recipient shows marked signs of improvement both in her mental and general condition.

August 7.—Four days after the transfusion the patient has improved markedly and is walking about the ward.

This patient went on to rapid recovery. She has presented no symptoms of the disease since the operation performed fourteen months ago. The recovery in this case was so immediate and complete as to be extremely suggestive.

Case 2: Bessie B., age 22, Referred by D. D. Armstead, Campbell, Ala.

For the past four years this patient has had attack of sore mouth, diarrhea and indigestion, beginning in the spring and lasting about six months each. During these attacks the patient was confined to her bed. About fourteen months ago, a red eruption appeared over the back of both hands and wrists. This was never painful, and disappeared in a few weeks. The patient has had sore mouth ever since the eruption appeared and there have been four or five soft bowel movements a day, for the past four months. For several weeks there have been marked mental and nervous symptoms. These are increasing in severity. Sensory symptoms have been present in the feet and head. In the past eight days, there has appeared an erythema over the dorsum of each hand, this has extended well up on the forearms, has become pigmented and has been associated with burning and pain. Coincident with this, there has been an axacerbation of the mental and nervous symptoms. There has developed a pulse rate out of proportion to the temperature.

On examination the patient presents marked emaciation and asthemia. Weight sixty pounds; average weight, one hundred pounds. Hemoglobin 75 per cent.

There is a dark dry pigmented eruption on the backs of both hands extending well up on the backs of both forearms. There are marked mental and nervous symptoms. Muscular reflexes are increased. Transfusion, July 3, 1909. The donor is a strong healthy male adult, a brother of the patient. The donor has never had pellagra. There was a good transfer of blood for thirty minutes. The donor had an attack of syncope upon leaving the operating room.

July 4.—Twenty-four hours after the operation there are marked signs of improvement.

July 7—Four days after the operation the skin lesions began to desquamate.

The marked nervous and mental symptoms began to rapidly disappear and were almost entirely absent within a week from the day of transfusion. The sore mouth disappeared within four days. The bowel movements were less frequent after the fourth day, and entirely disappeared within three weeks.

July 13.—Ten days after the operation, the patient weighs sixty-eight and one-half pounds, a gain of eight and one-half pounds.

The patient returned home, and has steadily improved. Three months after the operation she states that she is stronger, and has gained about fifteen pounds; that there are neither eruption, diarrhea, nor mental symptoms.

This patient has made a gradual improvement from the day of operation and will eventually recover entirely.

Case 3.—Annie H., age 42, white. Referred by Dr. P. A. Trice, Morvin, Ala.

One year ago, this patient had an attack of diarrhea of six months duration, there is also an indefinite history of erythema over the backs of both hands at this time. There was marked asthenia, anemia and emaciation during the attack. There is a history of nervous excitability, but no mental disturbances. There is no history of sore mouth.

On examination, the patient shows indefinite signs of an old desquamative skin lesion over the backs of both hands, increased reflexes, asthenia, nervous excitability and a marked grade of anemia. There is considerable emaciation, the patient stating that she has lost thirty or forty pounds in weight.

Transfusion, July 18, 1909. The donor is a healthy adult, male, (patient's husband.)

There was a good transfer of blood for twenty minutes, July 21, three days after the operation the patient shows definite signs of improvement.

Twelve weeks after the operation her physician writes that her physical condition is better, that she has gained fifteen pounds in weight, that her anemia is much improved. The patient herself says that she is stronger than she has been for the past three years.

Case 4—Mrs. T., age 27, white. Referred by Dr. Bailey, Demopolis, Ala.

This patient developed an erythema over the backs of both hands six weeks ago, this extended to the fore-arms, elbows, sides of the neck and upon the face. This has been associated with a marked stomatitis and nausea in the past three days. The stomatitis has been so severe in the past few days as to seriously interfere with feeding. There has been a profuse diarrhea and an increasing asthenia, anemia and emaciation. The nervous symptoms have been pronounced in the last few days.

On examination, the patient is found to be in a practically moribund condition, an ulcerating and deeply pigmented eruption covers the dorsal surfaces of both hands, forearms and the sides of the neck. There is a deeply pigmented mask over the entire face. There is ulceration of the mouth, a swollen blackened tongue protrudes from the parched and ulcerated lips, from which there constantly drools forth a fetid slimy discharge. This pigmentation extends over the legs and feet as well.

The patient is markedly emaciated and presents a terminal stage of anemia. The reflexes are almost absent, there is incontinence marked anemia and frequent emesis. Pulse 150-160.
Tranfsusion July 11, 1909. Two doners.

The first donor is a white adult female, who recovered a few weeks ago from a severe attack of pellagra. A good transfer of blood was obtained for ten minutes, when the transfusion was discontinued, on account of the weakened condition of the donor.

A second transfusion was performed from a healthy adult male (the patient's husband), who has never had pellagra. A good transfer of blood was obtained for fifteen minutes. The transfusion was then discontinued on account of the weakened condition of the recipient.

This patient was in a hopeless condition at the time of operation, and showed no signs of improvement after the operation. The patient died three hours after the operation.

Case 5.—Mrs. B., age 58, white. Referred by Dr. Bondurant, Mobile, Ala.

This patient was treated by her family physican, Dr. O. G. Bruner, of Fort Deposit, Ala., for a persistent case of diarrhea, extending over a period of over two years. One year ago there appeared an eruption over the backs of both hands, this was followed by desquamation. This eruption reappeared in the spring of 1909 about six months before transfusion, and

a few weeks before transfusion the patient developed marked mental and nervous symptoms.

On examination, there are remains of a desquamating skin lesion over both hands and forearms. There are constant involuntary muscle tremors, increased reflexes and the mental condition is that of constant delusions and at times a muttering delirium. There is asthenia and marked emaciation, weight 70 pounds average weight 100 pounds.

Transfusion, July 17, 1907. The donor is a healthy adult male (the patient's son), who has never had pellagra. There was a good transfer of blood for twenty-five minutes.

July 18—Twenty-four hours after the operation the nervous and mental condition is improved. This patient gained 8 1-2 pounds in the first week, and went on to a rapid recovery.

Eleven weeks after the operation, the son writes that the mental condition seems perfect, there are no symptoms of pellagra, and there has been a gain of 34 pounds in weight.

Case 6—Mrs. H., age 50, white. Referred by Dr. Sarah A. Castle, Meridian, Miss.

This patient has had attacks of diarrhea associated with sore mouth for the past two years. Four months ago, the patient had an attack of diarrhea, of two weeks durtion, and this was followed by a stomatitis that has grown very severe and persists. An eruption appeared on the hands about four weeks ago and extended over the forearms, face and legs. There have been marked nervous and mental symptoms for the past six weeks. This conditon has been that of acute delirium at times. There have been severe sensory and motor symptoms and incontinence of the bowels, a condition present for about a week.

On examination, there is found an almost hopeless anemia and emaciation. A desquamating skin lesion extends over the hands, arms, legs and face. There is a drooling, fetid discharge from the mouth, a marked stomatis, incontinence of the bowels, and at times a low mttering delirium.

Tranfusion, July 22, 1909. The donor is an arteriosclerotic, plethoric male, (the patient's husband) who has never had pellagra, age about sixty.

The anastamosis was accomplished with a great deal of difficulty, because of the extreme degree of atheroma present in the donor's radial artery. There was only a very small amount of blood transfered.

Transfusion, August 17, 1909. This patient made no definite signs of improvement, and was again transfused twenty-six days after the first attempt. At this time she was in the same physical conditon, except for a much more severe anemia.

The donor is a femals, age 18, (the patient's daughter), This donor recovered from a definite attack of pellagra two years ago. There was a good transfer of blood for twenty minutes.

August 18—Twenty-four hours after the operation, there is an aggravation of the mental symptoms.

August 23—One week after the operation, the patient has shown no definite signs of improvement, except that the stomatitis has cleared up to some exent. Death occurred four weeks after transfusion.

Case 7—Mr. G., age 30, white. Referred by Dr. J. L. Bryan, Greenville, Ala.

Six months ago, this patient developed an erythema followed by a pigmentation over the backs of both hands and forearms. During this period there has developed a severe diarrhea, mental deterioration and an extreme degree of emaciation.

On examination this patient presents marked asthenia and anemia. There are pronounced motor and sensory disturbances; a desquamating skin lesion still presents over the backs of both hands and forearms. The sore mouth and diarrhea, while present, are not severe at this time.

Transfusion July 25, 1909. The donor is a fourteen year old boy, (the patient's nephew,) who has never had pellagra. Because of the extreme restlessness of the youth, only a small amount of blood was transfused in the course of twenty minutes.

July 26—Twenty-four hours after the transfusion the patient shows no signs of improvement.

This patient became steadily worse and died August 20, twenty-six days after the transfusion.

This case was not transfused with any appreciable amount of blood.

Case 8—Mrs. S. H., age 30, white. Referred by Dr. Armstead, Nanafalia, Ala.

This patient had a severe attack of diarrhea about one year ago, associated with sore mouth and marked nervous and mental symptoms, duration two months. There were no skin lesions at this time.

The present attack began three weeks ago, with an erythema on the backs of the hands and wrists. This went on the induration, pigmentation and desquamation characteristics of the disease. This attack is associated with a severe atomatitis. During this attack, the patient has had marked nervous and mental symptoms, and has become emaciated and anemic.

On examination there are the remains of a desquamating skin lesion over the dorsum of the hands, wrists, forearms, and elbows. There is stomatitis and a mild grade of diarrhea. The patient has lost about forty pounds in weight.

Transfusion July 25, 1909. The donor is a healthy adult male (the patient's husband) who has never had pellagra. There was an excellent transfusion of blood for fifteen minutes, when the operation was discontinued as the recipient showed signs of cocainism.

July 26—Twenty-four hours after the operation the patient shows an improvement in her mental and nervous condition.

Ten weeks after the operation her physican writes that the patient has improved wonderfully since the operation. There is no skin lesion, no sore mouth, no diarrhea. The mental and nervous symptoms are much improved. The patient says that she feels better than she has in five years. She has gained about twenty-pounds in weight, and feels one hundred per cent. better than before the operation, according to her physician's statement.

Case 9.—Mrs. M., age 36, white. Referred by Dr. McMillan.

This patient has had attacks of severe diarrhea every spring for six or seven years. These attacks were of about one month's duration and cleared up without medical treatment.

Eighteen months ago the patient developed, for the first time, an eruption over the backs of the hands. This eruption lasted about a month, and went on to desquamation without pigmentation. At this time the patient developed a sore mouth and salivation, which was present about one month. The patient had another attack of diarrhea about four months ago, at this time she was anæmic, emaciated, and showed marked nervous symptoms.

Four weeks ago sore mouth again appeared associated with diarrhea, anaemia emaciation, asthenia, and an erythema which extended over the backs of both hands, well up on the forearms. This eruption became pigmented and desquamated. At this time the nervous symptoms were aggravated and there developed a mild grade of dementia.

An interesting point in this case is that there was a suspicion of diabetes for several years, and the patient was placed on a diet consisting largely of corn bread.

On examination she presents the remains of a desquamating skin lesion over the dorsal surfaces of both arms and hands. There is asthenia, emaciation and anemia. Hemoglobin 70 per cent. Weight 74 pounds, average weight 100 pounds. There is a profuse diarrhea. The mental condition at times is that of a mild dementia. Transfusion, October 18, 1909. The donor is a healthy adult male (the patient's husband), who has never had pellagra. There was a good transfer of blood for thirty minutes.

October 19—Twenty-four hours after the operation there is a distinct improvement in the mental condition.

Oct. 25—One week after the operation the patient has improved markedly in general condition, the mental symptoms have disappeared, the appetite is much improved and the patient has gained 7 1-2 pounds in weight.

It must be noted that the only medicinal agents used in the recovered cases, were tonics of strychnine, forced feedings, and in some cases carbonate of iron.

In every case benefitted by transfusion

the improvement was immediate, as shown by marked gain in weight within the first week, in one substance, as much as eight and a half pounds. All the patients two months after transfusion, are either apparently cured or markedly improved, and have gained from five to thirty-four pounds in weight.

Of the fatal cases; case No. 4 was moribund at the time of operation and died three hours after transfusion; case No. 7 received no appreciable amount of blood on transfusion; case No. 6, received practically no blood at the first operation, and at the second transfusion when a pellagrous donor was used while she received a good flow of blood, her condition, we felt, was hopeless.

CONCLUSIONS:

We suggest the following conclusions:

1. Transfusion offers a means of combatting the anemia, stimulating the recuperative functions and perhaps of furnishing antitoxic substances to pellagrins.

2. The lessened mortality and marked improvement in transfused pellagrins leads us to anticipate the establishment of a serum therapy in the disease.

3. Transfusion may be offered as a surgical therapeutic procedure in pellagrous cases pending the perfection of a successful serum therapy.

PELLAGRA IN YUCATAN

By GEO. F. GAUMER, M. D., Izamal, Yucatan, Mexico

Pellagra is a non-contagious, trophoneurosquamous, erythema, due to a specific cause.

HISTORY:

Although isolated cases of this disease may have existed in Yucatan at an earlier date, yet it was not until 1884 that it became epidemic.

In 1882 the locusts or grasshoppers invaded the state in such numbers that they destroyed every cultivated plant, and were especially destructive to the Indian corn or maize.

Corn being the only cereal used in Yucatan for bread, famine seemed inevitable until the merchants began to import corn from the United States. This importation of corn continued until 1891, when the country had recovered from the devastation of the locusts. The imported corn was brought from New York in the bottom of vessels as ballast and from careless handling and bad storage it was often rendered unfit for food. During the voyage this corn often got damp and even wet and by the fermentation caused by heat and humidity, a peculiar kind of fungus is developed which has been called "Sporisorium maidis." The constant eating of corn affected with this fungus produces a vitiated state of the blood which leads to the slow development of pellagra.

Among the better classes the disease seldom made its appearance, whether this was due to the fact that having the facilities, their food was better cooked, or because, having the means to purchase the little corn produced in the state, they were but small consumers of the imported article, it was the middle and lower classes who, from reduced circumstances were obliged to purchase the cheapest corn in the market, that suffered most from the ravages of the disease.

While pellagra had been known for many generations in Italy, Germany, and other European countries, yet it had probably never before made its appearance as an epidemic in any part of America; and yet, there is no good reason why sporadic cases might not have appeared occasionally wherever corn was used as an article of diet.

From 1891 to 1901, Yucutan produced sufficient corn for home consumption, and new cases of pellagra were no longer to be found, while the old cases ran their course and nearly all those attacked in former years died from the effects of the disease.

From 1901 to 1907, the corn crops were almost total failures, and corn was again imported in greater quantities than ever before. Most of the corn came

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from the United States; Mobile and New Orleans being the chief sources of supply, the remainder coming via Vera Cruz from the interiors of Mexico, or nearly the same distance by water.

Pellagra again became epidemic, but was not then confined to the middle and lower classes, as in the former invasion. The wealthy hemp owners on account of the exorbitant prices paid for hemp, found it was more profitable to import than to raise corn for home consumption, thus compelling even well to do people to consume the imported article, as the home product was no longer sufficient for the wealthy families. Pellagra then spread alike among the rich and poor, until by the close of 1907, about 10 per cent of the inhabitants were victims of the disease, and at the present writing not less than 8 per cent of the adult population have pellagra.

PRODOMES:

Lassitude, occular phenomina, vertigo, headache, general weakness and occasional digestive disturbances.

SYMPTOMS.

FIRST STAGE:

A patient upon first consulting a physician complains of a sensation of heat in the mouth, throat, and stomach, upon the exhalation of the breath; taste is impaired, there is anorexia, and frequently ptyalism with a broad flabby tongue irregularly marked by red blotches, a peculiar formication in the extremities which often extends very gradually to the whole of the body. About this time small, smooth and very lustrous specks make their appearance on the dorsal aspect of the hands and feet. These specks when first noticed by the patient are no larger than a pin head, but rapidly become more numerous until uniting they form lustrous patches which are checkered off in little squares, and these are separated by fine lines, thus giving the cutis a scaly appearance which is better seen by drawing the skin together with thumb and finger. This often covers the whole body, but is generally confined to the extremities, chest and back. The skin takes on a senile appearance and the itching becomes almost intolerable, and if scratching be resorted to for relief, the burning that follows is unendurable.

About this time the strength begins to fail, and the patient walks with a heaviness and a peculiarity in his step that he does not understand, he can no longer find his way with closed eyes. The reflexes become greatly exaggerated and his movements are incoordinate. His sleep is much disturbed by halucinations and strange dreams. During his waking hours he examines himself minutely and with frequency, and soon begins to carry on a constant though inaudible conversation with himself or some imaginary com panion.

In conservation with other persons it soon becomes evident that the mind wanders, before completing one subject, another is begun, meaningless words are thrown in and as important ones left out. The patient's description of his disease becomes long and tedious, and he often ascribes as a cause of his present condition, some insignificant disease or injury that befell him in his youth, and ends up with the assurance that some person who, knowing of the circumstances, has taken advantage of the opportunity to bewitch him.

SECOND STAGE:

As time goes on the physical sufferings become greater and greater, the skin wrinkles more, the appetite fails, and this is due to the perversion of the special senses of taste and smell, so that the patient looks upon the most savory dishes all kinds of drinks and even his medicines as filthy substances calculated to aggrevate his sufferings, if not to kill him. Hunger increases the mental derangements. Strength fails until the patient if confined to his chair or bed. The mind becomes more deranged as the itching and burning continue to rack his nervous system, so that he often seeks to put an end to his sufferings by committing suicide.

The bowels at first were often constipated, but as the disease advances a diarrhea sets in, which is accompanied by a progressive emaciation until the patient is reduced to a mere skeleton, or in some cases it passes into dysentery, which run

ning a rapid course soon terminates fatally.

THIRD STAGE:

Inasmuch as pellagra is a disease in which every symptom from its first appearance advances progressively to a fatal termination, the third stage is but the first and second in a state of progression in which the mental and physical phenomena predominate. Fear of impending danger often makes the patient want to flee from home and friends, and to take refuge in the forest, but upon finding himself devoid of strength and the power of locomotion, his fright increases and he strives to escape from an imaginary bondage. Friends are no longer trusted, but are treated as enemies.

All former symptoms are progressively intensified until the patient looses control of the mind and complete dementia generally occurs near the termination of the disease.

All psychosis are of the melancholic type, and tend to make the patient cowardly, rarely becoming aggressive.

Weeks, months and sometimes years are spent in this stage, during which time the patient gradually grows weaker until he is unable to swallow food or drink, to utter an audible word or to voluntarily move a single muscle; thus the spark of life is slowly but surely extinguished.

FORMS OF PELLAGRA:

In a practice of twenty-five years, I have been in the habit of recognizing three forms of disease known and treated here as pellagra. These I have classified acording to their cause as pellagra, pseudo-pellagra and pelagia.

Pellagra is a disease whose origin can always be traced to the ingestion of spoiled corn.

Pseudo-pellagra; a disease whose origin can always be traced in the use of alcoholic liquors.

Prior to 1900 nearly all of the liquor consumed in Yucatan was distilled in the state, and came from sugar-cane or bee's honey, and up to that date pseudo-pellagra was quite unknown.

Since 1900, for various reasons, Yucatan has ceased to produce the liquors consumed by its inhabitants, and they are now concocted from alcohol distilled from corn in the interior of Mexico, and essential oils skillfully prepared by experts in New York.

Since the artificial drink has been substituted for the pure distillate, pseudo-pellagra and other well marked derangements of the human organism have become quite common.

Pelagia, has no constitutional symptoms, and is purely a local condition due to exposure to the direct rays of the sun, and the inclemencies of the weather.

Any two or all three of these conditions may and often do exist in a patient at the same time.

In pseudo-pelagra as in pelagia, removing the cause cures the disease; although in most cases pigmentation remains through life.

Pellagra in its primary stages is often curable by the application of the proper remedies and by leaving off the use of corn. After mental phenomena have made their appearance the disease becomes incurable although by judicious treatment the course of the disease may be retarded and life prolonged.

In Yucatan, pellagra is not influenced by reasons as indicated by Dr. Lavinder in his "Pellagra a Precis," nor have I ever been able to detect any increase of temperature in connection with the various stages of pellagra. Ulcers and ulcerative precesses form no part of pellagra, but when they do occur as complications they are very obstinate and difficult to cure.

Desquamation never takes place in the earlier stages of pellagra, but in cases of long standing the constant scratching causes the cuticle to break up in the form of small, white, thin scales, which are thrown off in considerable numbers. The Indian Doctor makes his diagnosis by drawing his finger nail rapidly across the affected skin, if a white line of scales is left in its wake, the disease is pellagra.

TREATMENT.

The first thing to be done is to put the system in the very best possible condition for the assimilation of food and for the elimination of the disease. This must be done according to special indications in each individual case, but the remedies that have given the best results are, Rau-

wolfia heterophilia in small doses long continued. With the fluid extract of this plant many recent cases can be cured and with it the disease can be very much retarded in all cases.

Arsenite of Potassium alone or in combination with the Rauwolfia is a valuable remedy in many cases. Opium may be used to control the diarrhea, though it is liable to aggrevate the nervous symptoms in which case the fluid extract of Coccolobamifera being an astringent tonic is to be preferred in all such cases and is much more reliable.

As special tonics Aristolochia lirecipes, salvia serotins and hydrastis canadensis are to be preferred.

The severer nervous symptoms are controlled by Salanun torvum and piscidia erythrina. Insomnia finds a remedy in Passiflora ciliata and incarnator.

Edema and heart troubles may be best controlled by the use of Cereus grandiftorus.

The fluid extract of the above remedies are to be preferred.

In individual cases and when indicated good results may be obtained from the use of Sulphide of Calcium, Carbonate of Lithia, Arsenite of Copper, tincture of the Chlorid of Iron, Sulphate of Strychnia, Thuja occidentalis, Echinacea, Tagetes patrela, Phytolacca Mexicana and Quinine.

Many other remedies may be used to meet special indications.

As external remedies, few have any effect, but the best results have been obtained from the use of Sulphide of Soda in baths, and ointments of Arsenic, Carbolic Acid, and Tagetes patula will often remove all external signs of the disease.

The hygienic measures to be employed are frequently bathing with water at a temperature most agreeable to the patient. Exercise in the open air with a change of scenery and surroundings and frequent changes of clothing. Leave off the use of corn as an article of diet, and selct a healthful and nutritious diet of meats, fresh vegetables, and fruits.

DIFFERENTIAL DIAGNOSIS.

PELLAGRA.	PSEUDO-PELLAGRA.	PELAGIA.
In the beginning of the disease patient complains of a sensation of heat in the mouth, throat and stomach, on expiration.	Normal.	Normal.
Sense of taste impaired, there is anorexia and ptyalism.	Normal, sometimes present.	Normal.
Tongue broad, flabby and irregularly marked by red blotches.	Uniformly red.	Normal.
Bowels constipated followed by diarrhea and sometimes dysentery.	Diarrhea sometimes present.	Normal.
Cuticle assumes a scaly appearance, scales lustrous, thin and not detachable until disease is far advanced-seldom pigmented, and only affects the cuticle.	Dorsal aspect of all affected parts become erythematous ,assumes a dark color and are pigmented progressively, scales thick and detachable—epidermis and part of true skin affected.	All exposed parts become erythematous, assume a dark color and covered by large thick laminated scales detachable. Skin either cedematous or hypertrophied.
Pruritus and burning deepseated and aggravated by scratching. Affected differently by sun and shade.	Superficial, aggravated by sun's rays.	Slight, but the burning is intensely aggravated by sun's rays.

Muscular weakness marked and progressive.	The same.	Normal.
Vertigo, occidental headaches, insomnia, neuralgias and cramps.	If present can be traced to alcohol.	Normal.
Occular phenomena generally present.	If present, alcoholic.	Normal.
The gait is usually paralytic, occasionally paralytic spastic and progressively ataxic.	Usual symptoms due to alcohol.	Normal.
Mental phenomena progressive from slightest perturbation to complete dementia.	Alcoholic if any.	Normal.
The Pellagrin avoids company, seeks solitude, is distrustful, melancholic, avoids conversation, prefer the dark, wants no asssistance.	Seeks company, avoids solitude, is confiding, is cherful and talkative. Avoids the dark, wants help.	Normal, Indifferent.
Epileptiform movements rythmic and often continued to death.	Not rythmic.	No movements.
Pellagra is not limited to season, age, sex nor condition in life.	Limited to alcohol users.	To persons past middle life, who have been much exposed to sun's ray.
Attributable to the use of spoiled corn.	To the use of alcohol.	To exposer's to the sun's rays.
The pellagrin does not fear death, generally conscious at death.	Fears death, and is generally conscious at death.	Indifferent to death.

SYMPTOMATOLOGY OF PELLAGRA

By J. J. WATSON, M. D., Columbia, S. C.

The malady is so insidious in the beginning that it is difficult to state what the premonitory symptoms are, except that in all cases the history of gastrointestinal disarrangement for a longer or shorter period before the characteristic eruption appears, can always be obtained. There is usually more or less depression, coincident with digestive disorders, and it increases as the disease progresses. The gastrointestinal symptoms consist of a burinng sensation in the œsophagus or stomach, which changing in the color of the buccal mucosa. This membrane assumes a red, denuded appearance, which in some cases is accompanied by salivation and gingivitis. The appetite is never normal; either increased or diminished, the patient drinking large amounts of water when the burning sensation in the stomach appears Loss of weight occurs in eighty-four per cent. of all cases, being more pronounced in cases with diarrhea. Diarrhea is a most constant feature of the disease, but constipation is sometimes met in the earlier months and in those mildly infected. After these disorders have lasted for months, the characteristic symptoms of the disease appears, namely, erythema

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on the hands and arms not covered by the clothing.

THE SKIN ERUPTION.

This appears first in the early spring months, and while it is one of the most characteristic features of the disease, it is per se, one of the most insignificant. It is usually an index to the severity of the infection. The eruption commences as a severe sunburn on the back of the hands and the extensor surface of the arms to the height that the sleeves reach, usually extending around to the flexor surface just above the wrist, assuming a somewhat triangular shape, the base being on the radial side of the arm and not more than two inches wide in this locality. It does not usually exhibit a tendency to extend to the flexor surface. After a time the skin dequamates in fine scales if the inflaammation has been mild; if severe, large flakes will be exfoliated leaving denuded areas. As the redness fades, the skin assumes a characteristic light liver or chocolate color, which if once seen cannot be mis-

FIG. I.

taken or confounded with any other skin disease. In some severe cases, the palmar surface of the hand is also affected, and I have seen the skin desquamate in large flakes, leaving the inside of the hand soft and velvety. This eruption commences in February or March and continues until June, when it gradually fades, disappearing in July, or August. In some localities there is a slight recrudescense in October, but usually the skin remains healthy until the following spring,, when the eruption reapears and follows the same course as it did the previous year, except that it is more apt to be more severe. As a result of the repeated inflammatory attacks, the skin becomes pigmented and rough, the hands of a person twenty-five years of age, resembling those of a person seventy-five years old. Portions of the body protected by clothing are not subject to this erythema except the skin over the olecranon, which becomes very rough and pigmented, which Dr. Babcock attributes to pressure. The hands, arms, feet, and legs (of those who go barefooted), forehead, neck, and chest are the sites affected in the order named.

DIGESTIVE DISORDERS.

Diarrhea is a feature of the disease at some time in its course. It usually precedes the eruption by weeks or months. The stools vary in number from three to thirty in twenty-four hours, as many at night as in the day. It is in no way affected by ordinary treatment or diet. I have seen it persist in spite of the most careful feeding and large doses of opium and bismuth, and improve when no treatment was given and diet not restricted. It is therefore, not dependent upon errors in diet for its presence, but is a neurotropic manifestation dependent upon disease of the spinal cord that affects the sympathetic system. The diarrhea is at its maximum of intensity when the skin eruption is at its maximum, and gradually improves after June on July coincident with the improvement of the eruption. With this diarrhea there is meteorism. The condition persists sometimes after the diarrhea has disappeared.

TONGUE.

During the eruption, the tongue assumes a characteristic condition. It becomes bright red, first on the tip and edges, and gradually the whole surfaces is almost or quite a cardinal red. It being a cardinal symptom of the disease, I have denominated it the *cardinal tongue.* In addition to the color, it has other striking peculiarities. The epithelium seems to have been exfoliated, and the surface has a smooth, glistening appearance. The tongue is sometimes flabby, large and marked by the teeth. In other cases it is rigid and pointed, and seems smaller than normal. In cases of moderate severity, the whole buccal mucosa is also very red, and there is considerable increase in the salivary flow. In severe cases this salivation is extreme, the saliva constantly pouring out of the corners of the patient's mouth. This and the swollen condition of the gums, and enlargement of the salivary glands, are very apt to be mistaken for mercurial salivation, but just remember that in mercurial salivation there is always quite a disagreeable odor to the breath and while there is an odor to the salivation in pellagra, it is not the same disgusting, fœtid odor that is characteristic of mercurial salivation.

THE STOMACH

The burning sensation has already been mentioned. This continues, and in some cases pyrosis is a prominent feature, with or without belching. Vomiting occasionally occurs, but is not a constant feature in the early picture of the disease. These patients often have hallucinations referable to their stomach. One insane patient complained of worms in her stomach, and she said she could feel them moving and eating the walls it.

THE PUPILS.

In eighty per cent. of these patients you will find some abnormality of the pupils. The usual condition is dilation; the mydriasis resembling that produced by atropine. It may be bilateral or unilateral. In the latter the right pupil is more apt to be the one affected. Pupillary contraction is rather rare. Diplopia is not unusual, also photophobia. Lombroso observes that the left lachrymal papilla is sometimes white and the right pink. How can this pupillary manifestation be explained? Is it through the cilio spinal

centre? This centre is located in the cord between the first cervical and the two dorsal nerves, the part of the cord that is nearly always affected. We know that in apical pneumonia, it is not at all unusual to find mydriasis bilateral or unilateral. When unilateral, on the side corresponding to the consolidation. This accounted for by the stimulation of the cervical sympathetic for in this disease there is no spinal lesion.

PAIN IN THE BACK.

This is a strikng feature of the disease in the Italian patients whom I saw. Some of the patients walking stooped over But I have not observed it in patients I have seen here. Pains in various portions of the body, however, are often complained of. *Tenderness* at some point along the *spinal column* is almost constant. It is usual in the middorsal region and is easily located. It may be more acute on one side than on the other. In the patients I have examined, the right side was the tenderest. The reflexes are exaggerated, the patella reflexes especially being more lively. One may be this is the case, the most exaggerated more exaggerated than the other, when corresponds to the side that has the most

FIG. 2.

acute spinal tenderness. In very severe cases, rather those in which there are tetanic contractions, ankle clonus may be found. There is usually analgesia or anæsthesia on the backs of the hands and arms, corresponding to the site of the eruption. Later in the disease, when paresis sets in the reflexes are abolished. The pulse is accelerated, the usual rate being ninety to one hundred. The usual temperature is 97 to 100 F. The urine is pale, and the patient complains of a burning sensation during micturition, and sensation of weight on the bladder. The quantity is decreased; two pints is the average specific gravity 1.005 to 1.025, a low specific gravity being the rule. Reaction was in seventy-six per cent slightly acid; fourteen per cent. neutral, and ten per cent. alkaline. The cases with alkaline urine are very severe. Vertigo is complained of by nearly every patient and forms a very common feature of the disease.

GAIT.

The gait is either simple paralytic or paralytic spastic. The patients walk with their legs far apart, and as paresis sets in the stride is very much decreased, and the patient assumes a peculiar shuffling gait.

PACHIE PHEUOMENA.

Mental depression is as constant as the cholia. The patients seem to have forgot-mild case of the blues to severe melancholia. The patient seem to have "forgotten how to laugh. The poor sufferers imagine they haven't a friend on earth; that even their own children or parents dislike them and have some unreconcilable grievance against them. They are easily provoked to anger, and in many ways indicate lack of mental force. Hallucinations and delusions are sure to occur at some time in the disease, and no two patients will have the same delusion. In Italy ten per cent. of the patients become insane. As yet we cannot form any opinion as to what portion of our patients will become insane but if records are kept it will be a very easy matter to ascertain what proportion is demented.

I have endeavored to give a description of pellagra as it is ordinarily seen dealing only with the symptoms that are most apt to be present and the ones that should be carefully looked for and inquired into. The disease is very protean in its manifestations. In one case you will find paresis. The symptoms that are frequent in one locality are not observed in another. The disease has so many various manifestations that it would be too tedious to go into a description of the prominent features of each case. The Italians have recognized seven different kinds of pellagra, viz: Pelagra with erythema; pellagra wtih insanity; pellagra with desire for suicide by water; pellagra with desire to get away from water, pellagra with tendency to walk stooped; pellagra with vertigo; pellagra with desire to eat a great deal. Lombrone designates the folowing varieties: Cerebral, spinal, ganglia, atrophic, gastric, cutaneous, aph ro disiac and tetanic. Symptoms that are common in one locality are not known in another. For example, in Pavia, contrartures and mutism; in Verena, dilation of the pupils, and seldom insanity. In the Austrian provinces patients complain of sensation of salt in their mouths and sever pain in their backs. In some countries it is common to find suicides, in others infrequent. Oscillation of the head is also frequent in some localities, and not so in others.

COMPLICATIONS.

In Italy one of the most frequent is alcoholism. This is not so in the Southern States, for the few men whom I have seen were not alcoholic, and the women here do not drink. Acetonæmia is a frequent complication here and the same conditon obtains in Egypt (Sandwith), and as one would expect, the patients are often victims of phthisis, as the diarrhea incident to the disease is conducive to debility and lowered resistance.

There is a conditon described by Lombroso that I have never seen, yet I have no doubt that the condition exists in this State. He calls it typhus pellagra. The symptoms are those of ordinary pellagra. for several years, and in additon the patients have tetanic convulsions, dysphasia, vomiting, profuse diarrhea with ammoniacal odor, also the same odor with the convulsions, and the patients be- of the perspiration and urine; temperature 104 F., or over. This commences

with the convulsions, and the patient become unconscious and have acute delirium. The face is rigid and contracted, and sometimes tremor is noticed around the mouth. Opisthotonus occurs, reflexes are exaggerated, and there is ankle clonus. The least irritation causes convulsions. There is a great increase of urea in the blood; and the case always terminates in death.

3. Babes. Reference from Lavinder. "Pellagra, A Precis", a Report. P. H. & M. H. S. 1907.

4. Giovanna and Gatti. "Richorche sulle proprieta emolitiche e cit pracipitanti del siero di sangue di pellagroso." 1909.

5. D'Ormea. Reference same as (4.).

6. and 8. Antonini and Mirianni. "Contributo allo Studio dello sier oterapia nella Pellagra." 1904.

FIG 3.

1. Tizzoni, Reference from Wood. Journal A. M. A. 53 No. 4.

2. Lombroso. Reference from Watson. N. Y. Medical Journal, May 8, 1909.

7. Cole. "The Transfusion of Blood as a Therapeutic Agent with Report of Transfusion in a Case of Pellagra." S. Med. Jour. April 1909.

9. Wood and Green. Personal communication from Dr. Tisdale, dated Oct. 14, 1909.

11. Lombroso. Personal communication, dated July 29, 1909.

IS PELLAGRA COMMUNICABLE OR HEREDITARY?

By H. H. GRIFFIN, M. D., Asst. Physician, State Hospital for Insane, Columbia, S. C.

Medical opinion in Italy seems to be unanimously against the theory that pellagra is contagious or infectious. As the question, however, is today one of the most frequent brought to the attention of the general practitioner, and asylum physicians, I thought it worth while to review this particular phase of the pellagra problem, and I do this more particularly because of the action of the health authorities of certain states, that pellagra cases should be isolated.

To begin with, let me call to your attention the summary of the opinion generally entertained in Italy, about pellagra as given by Tanzi, who observes: "In short, pellagra is a disease of man and other vertebrates which in turn is derived from a disease of Indian Corn. The disease of the animals is an intoxication, that of the maize is an infection, the parasites of maize are not infective in animals."

All of us who have studied available literature, and it may be one hundred or more cases, must admit that as yet, we Americans are not in a position to dogmatize about pellagra. We constantly see cases which raise the question of its communicability whereas usually only one case developed in a family, yet instances have previously, and during this conference, been reported in which several members of the same family have developed pellagra. The members of a family are generally placed under exactly similar circumstances, those very ones which probably engender the disease. Furthermore, unquestionably, cases of pellagra develop in asylums in patients who have undoubtedly been associated with pellagrins, so it is pertinent and important not only to ask, but to determine the origin of this pellagrous syndrome. Unfortunately, the very large proportion, if not all of the cases have eaten products of Indian corn. So that unless we deny in toto the influence of maize as a probable cause of pellagra, we are forced to consider it as a possible factor.

A most admirable study of pellagra by Nicholas and Jambon of Lyons, France concludes that pellagra attacks three classes of individuals, namely:

1. THOSE WHO EAT CORN.

The malady here arising from the poor food.

2. THE INSANE.

The pellagrous syndrome in these cases being assigned to psychic depression, (as well as the food ration).

3. THOSE COMING UNDER NEITHER OF THESE GROUPS.

"Sporadic" cases and "pseudo-pellagra," in which alcoholism is the most common contributing factor.

Sandwith calls pellagra non-contagious in his definition of the disease. He further says that he is not converted to the Italian belief that pellagra is hereditary, excepting in the way that alcoholism is now believed to be so. Calderini noticed in 184 families comprising 1319 members inheriting predisposition, that 648 were diseased, 671 healthy, practically equally divided.

Says Nicolos and Jambon "The hypothetic role of heredity admitted by Strambio and Calderini was proven false by Roussel and Bouchard, false so far as including the transmission of a germ from parents to their children. But if by heredity one means only a debility of constitution of pellagrous infants, their pathological predisposition, this hypothesis is tenable and is verified by observers in countries where pellagra is frequent. (Here we might draw the parellelism between pellagra and tuberculosis.)

"Bouchard admits a morbid tendency, a predisposition and further says this predisposition is of less importance with-

*Read at the National Conference on Pellagra, Columbia, S. C., Nov. 3-4, 1909.

out exposure to the sun and poverty without which it would be incapable of itself of producing pellagra."

Scheube, Diseases of Warm Countries says "Heredity plays a part in the etiology of the disease, as the acquited predisposition of the nervous system to contract pellagra can be transmitted to posterity. Lombroso is even of the opinion that the disease itself is hereditary, especially from the grand parents. (Here, evidently, atavism is a more important factor in producing pellagra than immediate heredity.)

Further studies of etiology have appeared to show heredity prodisposition.

The investigation of Probizer, among school children, shows the offspring of parents afflicted with pellagra to be quite generally of poor development, both mental and physical. They are usually enemic, and subject to various nervous and digestive disorders, as headache, dullness, listlessness, dyspepsia, gastralgia, enteralgia, nausea and vomiting."

The mental symptoms manifest themselves especially at puberty (R. A. C. — Wollenberg Ass't Surgeon U. S. P. H. and M. H. Service on Pellagra in Italy.)

The disease is sometimes hereditary, the children of generations of pellagrins are frequently feeble in resistance and of lowered physical vitality and hence fall easy victims to the disease. (Marie.)

From Babes and Sion, I further quote, "Lombroso distinguishes two forms of hereditary pellagra: a somewhat more severe form and a very mild form. This is so far interesting as it deals with the so-called abortive forms, which Rousell will not recognize as pellagra. In such cases Lombroso found bad formation of the skull, extraordinary brachia-cephalia, or dolicho cephalia, retreating forehead, bad setting of the external ears,asymetry of the face, anomalies of the genital organs, many of them showing, according to Lombroso, a true pellagra sine pellagra, in that, they are merely single symptoms, as burning of the feet, pains in the back, leucorrhea, amenorrhea, vertigo, etc.,while desquamation and deliria are wanting.

We cannot, however, unconditionally approve of this view. We have not, ourselves, observed anything similar and it is difficult to refer such vague symptoms to a disease which is characteristic in its entire symptom-complex. Only in such places where misery, heredity and nourishment with spoiled maize, are shown to exist, can we assume that the injurious poisons cause some of the pellagrous symptoms, whereas we would by no means recognize pellagra cases with such single symptoms in places where pellagra is not found, and maize is not eaten.

"In the pellagra of small children exists, probably always, a congenital or hereditary element to which the poor nourishment and neglect make an essential contribution."

"It was indeed early recognized and especially emphasized by Lombroso that cretins and epileptics are predisposed by nature to pellagra."

PREDISPOSING CAUSES.

Inate weakness, as manifested in cretins and epilectics, and influence inherited from drunkards, pellagrins, syphilitics, and malarial ancestry.

These conditions involve the nervous system so that in the next and succeeding generations this vulnerability is even more marked.

Sanborn says pellagra is not transmitted by means of lactation. He further says, "Until quite recently, the majority of physicians believed in the hereditary transmission of pellagra. Contagion was not admitted but cases of conjugal pellagra have been reported."

Procopiu discusses at length both of my querie.s He says, "The non-contagion of pellagra is proven. The contrary opinion has been sustained by Saloman, Titius, Hameau and Casal. The peasantry who live in towns and come in intimate contact with an urban population, have never exhibited the appearance of a single case of pellagra; furthermore, the people who live in the country among pellagrins, but without using corn for nourishment, never become pellagrous themselves. Boniva has tried to inoculate this disease with the blood and with saliva, but without result. All these facts prove that pellagra is not contagious, as would be expected since it is an intoxication."

This non-contagion is an argument

against the microbian theory ofpellagra.

HEREDITY.

The heredity of pellagra has been sustained by Odoardi, Calderini, Landouzy, Ballardini, and a number of others.

"Pellagra is not hereditary although children of pellagrins develop it frequently. One almost never sees pellagrous nurslings. The children of pellagrins, if they do not eat corn, never become pellagrous, but the influence of pellagra makes itself felt from generation to generation becoming, for the race, a real cause for degeneracy."

"Boudin rightly says, 'Pellagrins transmit to their children an evident predisposition to this malady. This predisposition shows itself by their inferior physique which lessens their resistance to the toxin. If many members of a family are attacked, the fact is very natural all being exposed to the same cause' ".

Sachi says, "The offsprings of pellagrins are recognized by their uncertain gait, by their yellowish eyes, by their jaundiced complexion, by their fissued lips, by their coarse hair, by their puny, dull and apathetic appearance.

"Lombroso specifies predisposition to microcephaly, the absence of hair, atrophy of the genital organs and the hypertrophy of its abdominal ganglia.

"We have met with microcephalic offspring of pellagrins, but we have not noticed the absence of hair, on the contrary, we have sometimes marked its abundance. We have seen idiots born of pellagrous parents, and also dwarfs and cretins.

"Ordinarily the children of pellagrins are anemic and apathetic. Boudin believes that if the father is pellagrous, the predisposition to pellagra is transmitted to the boys and a pellagorus mother trans mits this predisposition to the girls. He supports this affirmation by a table of cases of pellagra which he had met in Italy."

This assertion has not since been confirmed."

The Italian school denies the communicability of pellagra, but admits that the descendants, especially the grand-children of pellagrins, are particularly susceptible to the unknown poison. In the face of long years, of observation by innumerable observers, such evidence is not lightly to be set aside. What American would presume, after a few years study of a limited number of cases, to set up his opinion against Lombroso, who said that he had studied pellagra all his life? He certainly had studied it for forty years in Lombardy and who shall undertake to estimate the number of cases he saw during this long period. While the French school does not admit the theory of communicability, they seem especially inclined in explaining their cases of "pseudo-pellagra" and "sporadic" pellagra to emphasize the influence of heredity and the role of alcoholism.

The German and Roumanian schools, if we may conclude from Babes and Sion, agree in the main with the Italians; I draw briefly two conclusions, namely:

1. That pellagra is not communicable, basing this conclusion upon the authority of many great minds who have spent a life time in the study of this disease. This seems to be the universal conclusion of those who by virtue of a large experience are in a position to speak and from the one hundred or more cases that have come under the observation of the staff of this institution.

2. That pellagra is hereditary—that is, in the form of a predisposition on a morbid tendency, such a tendency as we now believe to be inherited in tuberculosis, or even in insanity itself.

The hereditary pellagrin is especially vulnerable, not only to pellagra, but as well to physical and mental degeneration including insanity.

Granting this double hereditary weakness as proven to exist in the off-spring, that is the childern and especially the grandchildren of pellagrins—and further admitting as proven the prevalence of pellagra in our country among the white and black races to-day, and possibly existing for thirty or forty years past, are not brought face to face with a tangible explanation of the reason for the prevalence of insanity to-day, especially the increase of mental disease that has been steadily going on in the negro race since emancipation? If the pellagrous heredity from the past is a factor in producing insanity to-day, what

have *you*, the medical members of this conference, the guardians of the public health in many commonwealths, to say is one of the most tangible means of preventing insanity for the future? There can be but one answer, "Establish beyond doubt the real cause of pellagra, and remove it, and save humanity from two of its greatest curses; pellagra and its congener, insanity."

It has been well said by Dr. Zeller; when we know what pellagra is ,we shall be much nearer understanding what insanity is."

A THEORY OF THE ETIOLOGY OF PELLAGRA AND THE USE OF JUNOD'S BLOOD DERIVATIONS.

By GUSTAVUS WERBER, A. M., M. D., Washington, D. C.

Dear Doctor:—

I write to ask if you will kindly record for *me a guess* as to the nature of Pellagra and its proper treatment. I feel warranted in asking this since S. C. has more pellagrins than other states, and there will therefore be a better chance to try the remedy; and further that the remedy can do no harm if it does no good.

I presume that Pellagra is the result of poisonous spores finding their way into the blood with the food, and that these spores have unusual power in fortifying themselves when they reach the capillaries, and that the triad of symptoms of the disease is due to *congestion* resulting from the efforts of nature to bring enough of the defensive proteids of the body to bear upon the invaders to destroy them.

Whereever these spores become entrenched in the tissues exposed to the sun light, ther are stimulated to more rapid proliferation, and that protecting these patients from the direct rays of the sun would therefore retard the progress of the disease. X-rays, applied to the body in excess, will produce a somewhat similar disordered circulation, which is supposed to result from the poisonous action of the X-rays on the tophic nerves. The reason Pellagra is so rarely cured, is that the remedies heretofore used, have not the power to break up the *congestion*, and I therefore recommend that the more powerful remedy of the partial vacuum be tried.

The method recommended is that introduced by Junod in the year 1833, and of which I give some account in the enclosed paper read before the Medical Society of the District of Columbia October 13th, ult. If Junod's method is applied effectively in the earlier stages of the disease, I believe it will cure it. In the latter stages of the disease torsion and vibration in addition to the vacuum cup will probably be required to dislodge the entrenched germs in order that the blood in sufficient quantity may reach them. The most satisfactory application of the vacuum principle would be to act on the entire body at once, but the apparatus would be rather expensive for individual cases.

It must be borne in mind in administering the treatments that the capillaries in brunettes do not dilate as readily as in blonds, and that the members of dark skinned races require longer treatments than those of the light skinned races.

Breaking up the congestion by Junod's blood derivations I conceive to be a specific for the disease. Auxilliary treatment which would prove of the highest value are baths of super-heated air, the effluve of the Oudin current, and a local faradization with the high tension current,

Gustavus Werber, M. D.
Washington, D. C.

The following is a reprint from the Washington Medical Annuals, Vol VIII, No. 5. The paper was read before the Medical Society of Washington, Oct. 13, 1909, by Gustavus Werber, A. M. M. D., of Washington, D. C. formerly of Newberry, S. C.

JUNOD'S BLOOD DERIVATIONS:

By way of preface I would say that the reason I call your attention to some

ancient history in medicine is that I believe in the near future the physician will come to realize that he already knows that impoverished or vitiated, poisoned blood is the great underlying cause of disease, and that most abnormal conditions of the blood result in its imperfect circulation; and that the cure of disease, therefore, must consist in restoring the blood to its normal condition. The chronic diseases which now prove so unyielding to treatment simply resist our attempts to break the vicious circle, commencing with the imperfect depuration of the blood consequent upon the incomplete elaboration of its constituents, leading to stagnation in the circulation, and leaving the subject poisoned by his own blood. Holding this view, I hope I may be excusable in asking your serious consideration of Junod's claims for his neglected and almost forgotten method of blood derivation, which apears to me by far the most powerful and effective means ever used to correct the evils arising from an unbalanced circulation, and probably also as a means to stimulate the blood-making organs to increased activity, perhaps even to the point of restoring this function to the normal, when it has been seriously impaired.

I incline strongly to this belief from the absolute candor with which Junod tells of his results, and from the public endorsements given his method by more than fifty of his most eminent contemporary physicians, and from the known fact that bleeding a patient will stimulate the blood-making organs to increased activity. And I therefore call your attention to his work with the hope that some will be found to investigate, and give us additional facts, either to confirm or disprove what Junod claimed for his derivations; for to treat with indifference this demonstrated epoch-making discovery by ignoring it does not appear to me justifiable from the point of earnest truth-seeking. True, the technique is somewhat tedious and exacting, but this of itself is not sufficient reason why it should be repudiated by the whole profession.

Victor Theodore Junod took his doctor's degree in Paris, in the year 1833. and wrote his graduating thesis on the "Advantages of Haemospasia" (to draw blood), and submitted the derivators used to accomplish this end. For more than forty years he continued to make a specialty of applying his apparatus, to bleed the patient into his own vessels, and reported many brilliant cures in dangerous maladies. During this time he demonstrated his method in France, Germany, Great Britian, Italy, Austria, Spain and Turkey. In 1839 he was attached to the Paris hospitals in order to perfect his technique. In 1854 he was sent by the French government to the Department of Haut Marne, then decimated by cholera, and received a gold medal for stamping out the epidemic at that place. In 1858 the French government sent him to Algeria to study the effects of his derivations in the epidemics common in that country. Junod's writings on Haemospasia brought him the Montyon prize of the first class in 1836, and the Grand Prize for Medicine and Surgery in 1870. In the year 1843 his method was recommended to all the hospitals in France, by decree of the Minister of the Interior. Later he was awarded the gold medal at the London, Paris and New York exhibitions. Junod's method was highly praised by Magendie in his lectures at the colleges in France, and he was endorsed by other authors in their works, among whom are: Dr. Ch. Londe, Michel Levy, Bourgery, Vidal de Cassis, Nelaton, Phillipe Boyer, Berard and Denonvilliers. His public endorsers include M Louis Figuier, Nelaton, Velpeau, Ricord, A. Trousseau, J. Voisin, A. Labric, Gerardin, Barth, Honore and many other well known physicians of that period, and also the public officials of France.

Junod's work comprised (1) baths of compressed air, (2) baths of rarefied air, (3) blood derivations, which he called "Haemospasia." This was his favorite operation and principal work, and it is of this only that I shall speak. These derivations were made by applying airtight receivers to large surfaces of the body, and by exhausting the air from their interior, the blood and fluids of the body were forced from the parts still under full atmospheric pressure to those parts subjected to the action of the partial vacuum, or negative pressure. The parts usually subjected to the action of the va-

cuum were the arms and the legs, either singly in pairs or all at one time. It was rarely necessary to operate on the four extremities simultaneously, Junod's favorite operation being to apply the pneumatic boot to the leg and thigh of both lower extremities simultaneously. By means of a suitable pump, the air was gradually exhausted and a partial vacuum established usually commencing at minus one-eighth atmosphere and ending at minus 1-4 atmosphere. This diminution of the air pressure causes a dilation of the capillaries of the part to which the derivator is applied, and an enormous flux and engorgement of the fluids of the body were in this way brought about. With the derivator applied to the leg and thigh of both extremities he was, by means of the vacuum thereby produced, enabled to temp ily withdraw more than seven pints of blood from the circulation and inprison it in the limbs (the influence of the partial vacuum retaining it within the area covered by the derivator) from a few minutes to several hours, according to the condition of the patient and the nature of the offending cause; Junod observing that the most prolonged derivations often proved the most effective.

With such an application Junod noted that it usually required about an hour to draw enough blood from the circulation to cause fainting, and this was interpreted as a physical sign that his remedy had been applied "to effect." When the derivation was made simultaneously on both arms and legs, of course a proportionately larger quantity of blood was withdrawn from the general circulation and imprisoned, while from this double derivation it was noted that fainting almost invariably followed in any condition.

Junod claimed for this operation the lowering of the internal and external temperature of the body, causing abundant perspiration; the cure of diseases characterized by inflammation, and that it afforded invariable relief for local congestion; also that by a timely application fever was aborted, and that it quieted even the wild delirium of mania. He taught that his derivations had a rapid sedative effect, which is very useful in the treatment of many cerebral, thoracic and abdominal affections; also that they were attended by abundant and continuous perspiration, which plays a critical part in the treatment of certain affections. Junod's derivations usually produced sleep, or at least a calm, placid condition. Inflammation is subdued by relieving pressure, and more especially that affecting the nerve centers. Profuse perspiration after hæmospasia, denotes salutary crisis, from influencing the nervous system and that a kind of counter stimulation is established which quiets the action of an excited heart, and disperses inflammatory congestions. This critical sweat kept up in many cases for twenty-four hours or more, and was regarded as a valuable process to cleanse the blood of pathologic products inimical to health. By diminishing the mass of fluid in circulation Junod hastened the absorption of serum in other parts of the body, to overcome this constantly diminishing blood pressure induced in the larger bloodvessels. The renal and intestinal secretions were increased, and in many instances, he says, as much as though diuretics and purgatives had been administered. Junod states that it is certain that in most cases his derivaions, employed with persistence and moderation, act successfully by the renewed impulse they give to the circulation in combatting sanguineous stagnation if there is either active or passive congestion, and reestablishing the equilibrium between the contending forces of composition and decomposition if there is a defect of nutrition.

We have here a hint that his derivations stimulate to increased activity the physician's time-honored ally, the *vis medicatrix naturae*, but he gives no additional suggestion on this point.

The indications he lays down for his derivations are as follows: all congestions and inflammatory conditions, hemorrhages (internal and external), neuralgia, nervous affections, morbid growths of any kind (but he lays no claim to favorably influencing cancer, tubercles, or organic degeneration), meningitis, pneumonia, pleurisy, serous effusions following meningitis, pericarditis and peritonitis, or ascites from engorgement of the abdominal viscera, uterine hemorrhages, facial neuralgia and toothache, conges-

tion of the brain, dropsies, obstinate insomnia, delirium tremens, chorea, mania, and, in fact, all nervous affections which are not the result of organic disease.

In his "Theory and Practice of Hæmospasia" published in 1875, Junod gives the histories of 293 cases in which his operation is shown to have accomplished wonderful results. In the histories given, mania in several forms was cured, apoplexy causing paralysis of various organs—and he usually restored *at once* the power of speech and movement—aphasia, complete paraplegia, cerebral congestions with various complications, meningitis, numerous brain affections, many nervous and neuralgic affections, eclampsia, opisthotonos, hysteria in its worst forms epilepsy, convulsions, neuralgias and sciatica were cured. Affections of the eyes and ears of a serious nature were cured by his derivations. Many chest and pulmonary affections, as edema of the glottis, croup, laryngitis, bronchitis, pleurisy and symptoms of pulmonary phthisis were alike cured. In pneumonia his results were brilliant, congestive affections of the heart yielded readily, cardiac asthma, angina pectoris and peritonitis were cured.

Uuder the relaxing influence of haemospasia intestinal occulsion gave way, and strangulated irreducible hernias and dislocation of bones were readily reduced. In uterine affections his results were no less brilliant than in brain affections, metrorrhagia, dysmenorrhea, amenorrhea, were readily cured, and usually with one or two derivations. Of the urinary organs, nephritis, acute and chronic cystitis were cured. Under general maladies, he reports cures of cholera in all stages, typhoid fever with numerous complications, intermittent fever, rheumatism and gout. Surgical cases dependent on congestion were cured or materially benefitted. In his records Junod gives the names of many physicians having a knowledge of the facts, and taking into account the well-authenticated cures of such an array of disease, I think you will agree with me that the work of this painstaking, earnest, original investigator is well entitled to practical recognition at the hands of our profession.

One phase of this operation appears to me a simple question in hydraulics, in which the stagnant pools of the body are drained and the poisons causing disease are flushed out of infected areas by the flowing tide of new blood. And that Junod's derivations *would* cure many disease seems quite likely, from the fact that it appears to meet the requirements of the last three schools—the Humoral teaching that the cause of disease resides in the blood, and the Cellular that it resides in the tissues, and of the Modern school, which teaches that certain diseases are caused by noxious germs. Modern pathologists teach the blood carries anti-bodies and antitoxins which disable germs preparatory to their final annihilation by the leucocytes. Now when the disease producing germs become intrenched in the tissues, the battle is made short and decisive, in proportion to the ability of the circulation to bring upon the battle field the required defensive proteids of the body. Drain the fluids from the tissues and you remove the soluble poisons, and perhaps some of those not in solution, by mechanical displacement, causing leucocytosis. Perhaps wandering leucocytes are by this means returned quickly to the circulation. I fancy when Junod reduces the pulse to a thread he sends a signal of distress to every cell of the body outside the area of the vacuum to hurry on its quota of fluid to sustain the failing circulation, and, the imprisoned blood being mainly arterial, that a powerful *aspiration*, in effect, ensues to draw fluids to the heart and large arteries. When the derivators are removed *reaction* sets in, and the new blood flowing into the tissues carries fresh supplies of the defensive proteids of the body to check invasions, and food to restore health and strength.

When Junod removed enough blood from the brain to suspend the action of the conscious mind I suppose he necessarily lessened the power of the brain to supply nerve impulse to the body through the spinal cord. Just here Junod's investigations stopped and I think it may prove profitable for our investigations to continue the study to ascertain just what happens when the conscious mind is held in abeyance.

The work of Junod has stimulated the

development of the cupping glass described by Celsus, which is used for making derivations on a smaller scale, and in many cases with the sole object of producing hyperæmia. The principle laid down by Junod, that the most prolonged derivations are generally the most effective, I conceive to be a correct one, and the vacuum cups which I show you were designed to accomplish this result. Hence their much larger cubic capacity than cups formerly used for this purpose. These cups are made in five sizes with a capacity of about 17, 40, 84, 97 and 132 cubic inches. Cups of smalelr capacity are now supplied by the instrument makers which *redden the skin beautifully,* but the degree of vacuum cannot be regulated with the nicety required to fill the deeper vessels with blood. These cups have been used with encouraging results in the treatment of locomotor ataxia, neurasthenia, congestion of the brain, indolent ulcers and incipient gangrene, and in general are beneficial wherever local hyperæmia or a derivative action in a circumscribed area is desirable.

The general indications for their use is the gradual reduction of the vacuum ending at from minus 1-3 to minus 1-2 atmosphere, and, if retained in place from fifteen to twenty minutes, the application generally suffices to fill the deeper vessels.

UTERINE CANCER

Cancer of the uterus, that disease which accuses the entire medical profession of want of knowledge, is as great a problem as ever. While medical science is aiming to find the cause, the disease itself should be combatted as soon as the first symptoms present themselves This is a truism that should be reiterated every day. Samuels,' in the *Medical Fortnightly* (August 10), in a paper which, though not brilliant, is readable again takes ocasion to force home the necessity of early diagnosis.

"We may conclude by saying that the most essentia l factor for successful treatment of cancer of the uterus is an early diagnosis. This may be accomplished best by the medical practitioners making careful and painstaking examinations of their patients. In doubtful cases a mocroscopic examination of the tissues should be made. They should instruct their patients as to the manner in which the menopause occurs, viz, suddenly , by gradual lengthening of the intervals, or by gradual diminution in the amount, and they should be cautioned to seek advice without delay if irregularities from the foregoing occur."—From Lancet Clinic.

TRAUMATIC UNCOMPLICATED —Dr. Schulz *Beit. Klin. Chir.,* Bd. 60) regards the prognosis of these cases as rather unfavorable, even if the condition is recognized early and properly treated. The chief cause of this and contraction of the capsule of the joint and of the surrounding tissues. To prevent ankylosis or habitual luxation massage should be employed as early as the first few days in connection with cautious movements, which are gradually increased in extent.

Aspirm can replace morphine for many of the post-operative pains, particularly at night.—*American Journal of Surgery.*

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never earned general acceptation, and the phloridzin and indigo-carmine tests have not an absolute value.—*American Journal of Surgery.*

One of the simple and best differential signs between renal and vesical hematuria is obtained by standing the urine in a conical glass for twenty-four hours. In hematuria of vesical origin, all the blood has settled to the bottom by this time; in renal hematuria, the whole fluid remains smoky.—*American Journal of Surgery.*

DEPARTMENT

Of the Society of Medical Secretaries, South Carolina Medical Association.

DR. ALLEN J. JERVEY, Charleston, Chairman.
DR. MARY R. BAKER, Columbia, Vice-Chairman.
DR. L. ROSA H. GANTT, Spartanburg, Secretary and Treasurer.

THE INSURANCE FEE QUESTION.

By W. J. BURDELL, M. D., Sec. Kershaw County Society.

Apropos to the letter of Dr. Cheyne in the September issue of the Journal, I beg to suggest that each county secretary appoint a meeting of his society between now and the April meeting of the House of Delegates, at which meeting there shall be a full discussion of this insurance fee matter. Let each society study carefully the different features of the various classes of insurance examinations, or inspections as the case may be and then come to some decision in the matter. When this discussion is over, let a brief summary be given to the Journal by each secretary. In this way a fairly full discussion of the matter can be run through the Journal and at the April meeting the matter can be discussed more intelligently and briefly than it has been heretofore and perhaps a more satisfactory ruling made.

I know some good men, men who are thoroughly ethical, who see nothing more in some of the industrial examinations than a simple inspection of the applicant, and I know that some of these applicants are men who are financially unable to pay the premiums of either the fraternal or the old line companies. They do not get as much in the face value of the policy, but they do get as Dr. Cheyne says, "decent burial" out of it. I also know men, who are good, true, and ethical men who think that we physicians could very well examine an applicant for, let us say for example, Woodmen insurance, for three dollars. In the case of an applicant for Woodmen insurance the applicant pays one dollar per month premium on a thousand dollar policy, whereas the same applicant would pay thirty six dollars per annum on a thousand dollar policy in an old line company. In the case of the Woodmen insurance, the applicant pays the fee and in the old line company, a rich corporation pays the fee.

Personally, I prefer the straight five dollar fee, where urine analysis is required but I readily see that the other fellow has some basis for his belief.

At the annual election in each county, let instructed delegates be sent to the House of Delegates.

COUNTY SOCIETY REPORTS.

FOURTH DISTRICT.

E. W. Carpenter, M. D., Secretary.

The Fourth District Medical Association convened at Easley, S. C., Nov. 15th, 1909, and was called to order by the president, F. A. Hines, at 1:30 p. m.

Dr. Fred Williams, of the State Board of Health, discussed at length and in a scientific way the attitude of the Board of Health and the relation of every physician to the greatest of our social problems. He was followed by Rev. D. W. Richardson, who has much personal magnestism as a speaker. He had given much thought to this problem while pur-

suing his studies in Europe and presented it from the view point of a scientific laywan and a desiple of the Master. If no other paper had been prepared for the session,t hemeeting would have been a marked success, for this subject is a live one and the messengers held the attention of each member with their clear incisive plea for ignorant men and women and innocent babes.

Doctors J. R. Gilliland, H. R. Black, Geo. Thompson, C. M. Walker, C. F. Ross and J. C. Harris, read interesting papers. Doctor J. W. Jervey reported an interesting case of disease of Cornea in a patient with hookworm.

The next place of meeting will be in Greenville, S. C., on the third Monday in November, 1910.

Dr. W. A. Tripp, was elected president.

Dr. C. B. Earle, was elected vice president.

Dr. E. W. Carpenter, was elected secretary and treasurer.

SPARTANBURG COUNTY.

L. Rosa H. Gantt, M. D. Secretary.

At the October meeting of the Spartanburg County Medical Society, the attendance was a little below the average, but this was nevertheless a very good meeting.

A very interesting paper on the Treatment of Pneumonia was read by Mr. S. F. Blakely and discussed by Dr. F. L. Potts.

Dr. Leland Anderson read a very clear and concise report of a case of Chronic Diarrhœa of nervous origin, Dr. Edwards leader of the discussion, complimented the author on the fact that he used no proprietary remedies in the management of his case.

Dr. D. Lesesne Smith announced that he, with several of the younger members of the profession had opened a clinic and invited the Society to visit it and send their charity cases there.

It was decided to hold a pellagra meeting in November and write Dr. Babcock and Lavinder to be present and read papers.

The opinion of the society on the subject of fraternal and industrial Insurance could not be obtained as the members would not discuss it.

TUBERCULOSIS MEETING.

At the first public meeting of the Spartanburg County Anti-Tuberculosis league held in Spartanburg on October 16, at the First Baptist church, Dr. John L. Dawson, of Charleston delivered a lecture on Tuberculosis to over 600 people. This was a record breaking Saturday night audience for it is difficult to get people together for anything but amusement on this night. A very attractive musical programme had also been arranged and three artists from Converse College rendered beautiful solos. For three quarters of an hour Dr. Dawson held the attention of the entire audience and even though there were many school children present all seemed very keenly interested in this instructive address which was couched in language such as a child could understand and an adult appreciated. Short talks were made by Dr. Snyder, President of Wofford College, H. E. Ravenel, Esq., and Rev. L. M. Roper. Before the close of the meeting slips of paper were passed around asking all of those who cared to join the League to sign their names. When these were counted it was found that 68 new members were added, there being on the list the names of many prominent business men. After the meeting numbers went up to meet Dr. Dawson and thank him for the instruction he had given. So enthusiastic were some that they have requested the officers of the League to try and get Dr. Dawson to come back and deliver another lecture. This meeting had been extensively advertised by pastors and in the newspapers, which very kindly made mention of the event every day for a week.

The "lymphangeoplastic" operation of Simpson Handley is simple and may prove a great boon to patients suffering from otherwise incurable edemas of the extremities (elephantiasis, compression of the axillary vein by cancer of the axillary nodes, obliterating thrombosis of the iliac vein, etc.)—*American Journal of Surgery.*

JOURNAL OF THE SOUTH CAROLINA MEDICAL ASSOCIATION.

FLORENCE, S. C.

PUBLICATION COMMITTEE
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Dr. F. M. Dwight, Wedgefield, S. C.
Dr. J. T. Taylor, Adams Run, S. C.

Dr. F. H. McLeod, Florence, S. C. Editor.

THE PELLARGRA CONFERENCE.

The National Conference for the study of Pellagra, held in Columbia, November the third and fourth, under the auspices of the State Board of health, was a success.

An attendance of nearly four hundred physicians showed the interest that Pellagra has attracted, and though most of those present were from the South, quite a number were from the North, and there were six papers from foreign countries.

About forty papers were read, dealing with the disease in all of its phases. We give the entire *Journal* to the subject of Pellagra, and wish we could give space to many more of the valuable papers, but the full proceedings will be published by the State Board of Health, and will make a most excellent and valuable treatise of the disease.

The literature of Pellagra, in the English language, is not full; and the proceedings of the meeting, when published, will make a notable addition to the literature on the subject.

It was not expected that anything new as to the etiology and treatment would be brought out at this conference, but certainly the greatest good must come from the meeting.

The organization of the National Association for the study of Pellagra was the result of the meeting, and from now on there will be an organized investigation of the disease, and much is to be expected from this organization.

The officers of the new Association are President, Dr. J. W. Babcock of Columbia, S. C.

First vice President, Dr. White, Washington D. C.

Second vice President, Dr. C. Fred Williams, Columbia, S. C.

Secretary, Dr. G. A. Zeller, Peoria, Illinois.

The Association will hold its next meeting in Peoria, Ill.

A resolution passed indicates the opinion of those who have had experience with Pellagra, as follows:

"Resolved, that while sound corn is in no way connected with Pellagra, the evidence of the relation between spoiled corn and Pellagra seems so apparent that we recommend that such measures as are necessary to prevent its use as food be instituted, pending further investigation of the subject."

Honor and praise to the zeal and energy of the State Board of Health, its efficient secretary, Dr. Williams, and to Dr. Babcock, the father of the Pellagra movement in this country, for the success of this meeting.

It was most fitting that the conference should be held in Columbia following the meeting of a year ago.

The conference was delightfully entertained at a smoker by the Columbia doctors at Ridgewood Club, and every courtesy was shown the visiting physicians, and their comfort looked after in every possible way.

THE AESCULAPIAN.

We have received the first copy of THE ESCULAPIAN, a monthly magazine published by the students of the Medical College, of South Carolina.

It is bright and snappy, full of college news and is interesting and entertaining.

The editors and their departments will be as follows: Editor-in-Chief, Simons R. Lucas, '10; Literary Department, Fitzhugh Salley, '11; Local, Theodore G. Croft, '12; Business Manager and treasurer, Harry W. Gumb, '13; assistant business manager, Walter Guerry, '13.

The subscription price is fifteen cents per month; seventy five cents a year.

THE TREATMENT OF SCABIES OR COMMON ITCH.

Bunch states in the Lancet of April 3, 1909, that when he sees a general eruption, scratched or pustutar, and when the patient complains of itching, he always looks for burrows, whoever the patient may be. If he can demonstrate acarus there can be no question of the diagnosis and he does not consider it within his province to inquire from whom the acarus came. It is a is a fact however, that one variety of mange in the dog is due to an acarus which may infect man, and persons who have much to do with dogs may become infected in this way. The face is always affected in these cases, whereas ordinary scabies does not cause any lesions of the face in adults.

The treatment of scabies aims essentially at opening up the burrows, destroyng the acari ,and allaying the itching. The best way is to make the patient soak in a hot bath for a quarter of an hour, then scrub himself with soft soap, using a nail-brush for the hands and feet. After washing off the soap the sulphur ointment of the Pharmacopœia is rubbed all over the skin except the face, and left on for three days. The patient then has a starch bath toallay the irritation and applies boric ointment to any patches of dermatitis which may be present. It is important not to use any sulphur after the third day, otherwise an unpleasant degree of eczema or artificial dermatitis may be set up which will cause great itching. In place of sulphur B-naphthol in 20 per cent ointment may be rubbed in after thebath and again on the three following days. It has the advantage that it is not so efficacious. The same may be said of balsam of Peru, and the writer prefers toorder sulphur. Inany case thecloths mustbe disinfected and the patient kept under observation for ten days to make to sure that all ova have been destroyed.—*Therapeutic Gazette.*

REPRINTS.

To the Authors of Articles in "THE JOURNAL OF THE SOUTH CAROLINA MEDICAL ASSOCIATION" and Others Interested.

Reprints of articles in this Journal will be furnished at the following prices, provided the order is given before the type is remelted:

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Abdominal pains associated with a small mass in the umbilical region, or at the brim of the pelvis, should arouse the suspicion of a possible "fused," "horseshoe," or "pelvic" kidney.—*American Journal of Surgery.*

The examination of the urine secured from each side by ureter catheterization is the most satisfactory means of determining the condition and functional activity of each kidney. Cryoscopy

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When a pyloric carcinoma is palpable, preoperatively, radical removal is usually impossible—H. N—American Journal of Surgery.

The examination of the eye ground's will often be the first clue to atu mor of the brain.—N. H.—American Journal of Surgery.

Osteosarcom a about a joint may closely simulate a rapidly-growing exostosis deformans.—H. N.—American Journal of Surgery.

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SOUTH CAROLINA MEDICAL ASSOCIATION

Next Annual Meeting at Laurens, S. C., April 20, 1910.
House of Delegates Convenes April 19, at 2 p. m.

District No. 1: Charleston, Berkley, Dorchester, Colleton, and Beaufort. Councilor, Dr. J. T. Taylor, Adams Run, 1911.

District No. 2: Orangeburg, Bamberg, Lexington and Calhoun. Councilor, Dr. W. P. Timmerman, 1910.

District No. 3:—Saluda, Newberry, Greenwood, Laurens and Abbeville. Councilor, Dr. O. B. Mayer, Newberry (Chairman of Board), 1911.

District No. 4: Anderson, Oconee, Pickens, Greenville, Spartanburg, and Union. Councilor, Dr. J. F. Williams, Roebuck, 1912.

District No. 5: Cherokee, York, Chester, Fairfield, Lancaster and Kershaw. Councilor, Dr. W. B. Cox, Chester, 1910.

District No. 6: Chesterfield, Darlington, Florence, Marlboro, Marion, and Horry. Councilor, Dr. William Egleston, Harstville, 1911.

District No. 7: Richland, Sumter, Clarendon, Williatmsburg, Georgetown and Lee. Councilor, Dr. F. M. Dwight, Wedgefield, 1910.

District No. 8: Barnwell, Aiken, Edgefield, and Hampton. Councilor, Dr. T. G. Croft, Aiken, 1912.

Officers

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Secretary, Walter Cheyne, M. D. Sumter.

TABLE OF COUNTY SOCIETIES AND OFFICERS.

Where information is wrong or lacking in the columns below County Secretaries are urged to supply it correctly to the editor without delay:

County Society	President	Secretary	Time of Meeting
Abbeville	J. A. Neuffer.	C. C. Gambrell, Abbeville	
Anderson	J. L. Gray	J. R. Young, Anderson	Semi-Mo., 1st and 3rd Monday
Aiken	C. A. Teague	T. A. Quattlebaum, Gr't'ville.	Monthly, 1st Monday
Bamberg		J. J. Cleckley, Bamberg	
Barnwell	No Society.		
Beaufort	H. M. Stuart	M. B.Cope, Port Royal	
Charleston	John L. Dawson	A. J. Jervey, Charleston	Semi-Mo 1st and 15th
Cherokee	William Anderson.	J. G. Pittman, Gaffney	
Chester	J. G. Johnston	W. B. Cox, Chester,	Monthly, 1st Monday.
Clarendon	W. M. Brockinton	C. B. Geiger, Manning	Quarterly
Chesterfield	T. E. Lucas	J. W. McCanless, Chesterfield.	
Colleton	Ben Willis	T. G. Kershaw, Walterboro.	Monthly.
Darlington	J. F. Watson	J. C. Lawson, Darlington	
Dorchester	F. Julian Carrol.	E. W. Simons, Summerville.	Monthly, 1st Monday.
Edgefield	S. A. Morrell	J. G. Edwards, Edgefield	
Fairfield	R. B. Hanahan.	Samuel L'ndsay, Winnsboro.	Quarterly
Florence	F. H. McLeod	J. H. Peele, Cartersville	
Georgetown	W. M. Gaillard	J. LaB. Ward, Georgetown.	Monthly 1st Friday.
Greenville	L. L. Richardson.	W. M. Burnett, Greenville.	Monthly, 1st Monday
Greenwood	R. B. Epting	J. B. Hughey, Greenwood	Monthly, 1st
Hampton	T. B. Whatley	C. A. Rush, Hampton	Monthly, 3rd Wednesday
Horry	A. D. Lewis	J. S. Dusenbury, Conway	Monthly, 2nd Monday
Kershaw	S. C. Zemp	W. J. Burdell, Lugoff	
Laurens	W. D. Ferguson.	J. H. Teague, Laurens	Monthly, 4th Monday.
Lee	B. L. Harris	R.O.McCutcheon, Bishopville.	Monthly, 1st Tuesday.
Lexington	W. L. Kneece	J. J. Wingard, Lexington	Quarterly.
Marion	A. McIntyre	Z. Smith Marion	
Marlboro	W. E. Eaddy	Chas. R. May, Bennettsville.	
Newberry	J. M. Kibler	J. J. Dominick, Prosperity.	
Oconee	J. W. Wickliffe.	E. A. Hines, Seneca	
Orangeburg	W. L. Pou	D. D. Salley, Orangeburg	Monthly, 3rd Tuesday.
Pickens	J. L. Bolt	R. J. Gilliland, Easley	Monthly, 1st Wednesday.
Richland	L. A. Griffith	Mary R. Baker, Columbia	Every 2nd Monday night.
Saluda	D. B. Frontis	J. D. Waters, Coleman	
Spartanburg.	S. T. D Lancaster	E. R. Wilson, Sumter	Monthly, 1st Thursday.
Sumter	Archie China	R. R. Berry, Union	Weekly
Union	J. T. Jeter	L. Rosa H. Gantt, Sp't'nb'g.	Monthly, last Friday.
Williamsburg.	W. H. Woods	E. T. Kelley, Kingstree	Monthly
York	M. J. Walker	John I. Barron, Yorkville	Bi-Monthly

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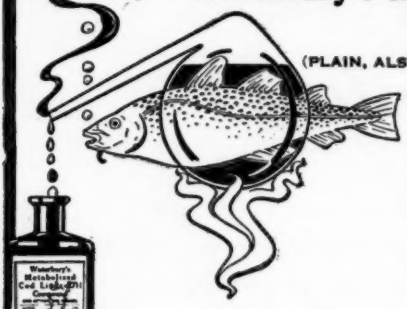

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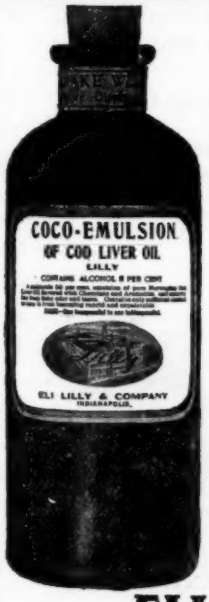

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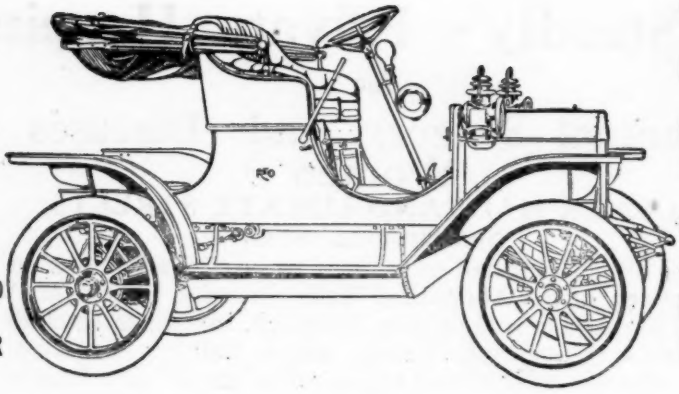

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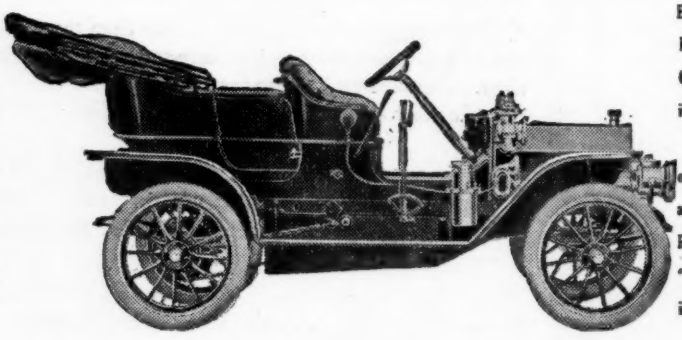

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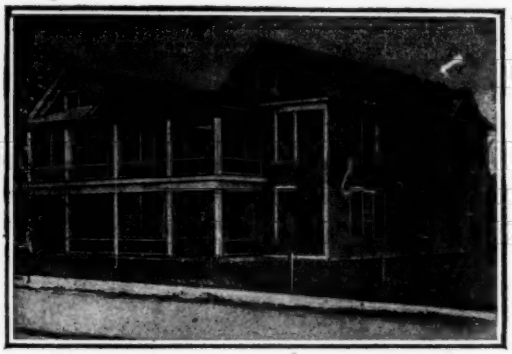

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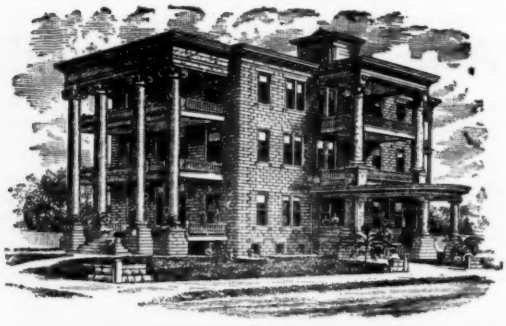

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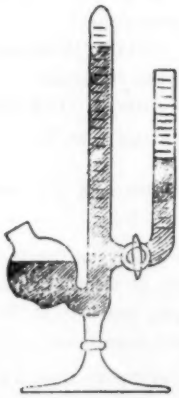

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